From Taps to Hope

By Greg Kempf

Chapter 1

Feb 3, 2041

When I stepped off the train station escalator, it was snowing harder than when I had gotten on, just a few stops back at the Federal Triangle. My feet had become cold almost as soon as I had left my office, not noticing a drift and getting snow down my shoes. *Why hadn't I worn boots*, I asked myself for the umpteenth time since leaving the office. The short ride had warmed my feet a little, but I knew it was just a matter of time, with this wind, before I'd be miserable again. There wasn't even any relief by stepping in tracks made by previous pedestrians; the wind had blown those away in mere seconds. So there was nothing to do but walk the few blocks home, as quickly as possible through ankle-deep snow, trying to dodge the deepest. My hands and chest weren't cold in my lined overcoat, but after just a block, I was again cursing my stinging feet. *What a winter we're having this year*. We'd had mild ones for so long, I'd forgotten what a truly bitter one felt like. Week after week of extreme cold and heavy snow. Tonight, especially painful due to this damn wind which now had my eyes watering. I finally saw our apartment through my tears, mounted the stairs gingerly on my frozen toes, and fumbled with keys, trying unsuccessfully to keep my hands from shaking.

Bev must have heard me come in and rounded the kitchen corner as I was pulling off my second dripping sock. She was still dressed from work; her dark-brown slacks matching her medium-length hair and her off-white blouse matching her highlights. I noticed the red scarf she'd worn with her coat, hanging on the door knob with a growing puddle beneath them. We gave each other an obligatory peck then commiserated how miserable it was getting home.

"I've just put dinner in the oven, so it'll be an hour till it's ready."

"I'm going to finish getting out of these wet clothes and then review a report tonight. Just yell when it's ready," I replied, untying my blue striped tie.

"Again," with her unmistakable biting tone which I knew so well. "You just got back in town a couple of days ago; can't you take a few nights off to spend some time with me?"

"I'm sorry, but I really need to finish this. We start making decisions tomorrow, and there have been too many interruptions at work to do it there. I got behind while I was out of town, and I'm still catching up."

"And Thursday night you're playing poker, so we won't see each other then either." Her hostile voice echoed her facial expression.

"You're going out with the girls, and I didn't bring any work home last night." Now irritated at the barrage.

"First evening we spent together in almost a month without you doing something for work, it must have really put you out." Bev turned and headed back to the kitchen.

"Well, at least when I'm playing poker I don't get all this drama," I said almost in a shout. I headed for the bedroom; for dry clothes and some quiet.

We'd had this argument so many times, but I knew even if I offered to put off the report till after we ate, she'd just harp at me the whole time anyway. Better to get it over with now and apologize over dinner.

After pulling on dry slacks and a comfy T-shirt, I walked across the hall to our makeshift study, fired up the computer, and quickly became engulfed in the report details. Work had always been my coping mechanism, and it quickly brought calmness to my evening like it had so many other times after one of our arguments.

Through the open door, I could overhear Bev talking to her sister Rita on the phone, not loud enough for specifics, but enough to hear the angry tone. No doubt she was complaining about me again. Bev called her whenever we had a disagreement, so Rita had become her ally against me. The complaints had been so common lately, the last time we saw her, she couldn't even look me in the eye, avoiding me the whole evening.

After a bit, I heard the front door open, then quickly close. Figuring Bev needed to get something for dinner at the neighbor's, I kept reading. The next time I glanced at the time, the hour was up. I ventured into the kitchen, planning to pour us both a glass of wine which usually helped start the apologizing process. But I saw the oven was off and nothing was cooking on the stove top. Glancing around, I saw a notepad on the table with Bev's familiar handwriting. "I need some time to think things over," was all it said.

"Oh shit, now what?" I said, trying to figure out what it meant. Maybe she hadn't gone next door to Janet's, but to Rita's. I headed to our bedroom to see if she had packed anything. Her overnight bag was gone, along with her coat from the door-knob; her red scarf lying in solitude in the puddle below. *How had I not heard her packing*? Rita's was almost an hour away by train. A cab would be quicker, but who knew how long she'd have to wait for one in this weather. *Should I call or let her have some time*? I knew whatever I chose would be wrong, but eventually I decided to give her time to cool down before I tried. I grabbed a large cup and went to the pantry for my favorite fast meal, dry cereal. I chose Froot Loops knowing I'd need the sugar to keep me alert. I poured a glass of soda to wash it down then headed back to the computer to finish the report while I snacked.

After I finished reading, I tried her phone—voice-mail. I went back to the report and began making changes. An hour later, I called again with the same result. Over the next couple of hours, I called several more times, each one failing. Around eleven, she finally sent a text. "At Rita's, I'll call when I'm ready."

After finishing the edits, I saved my work and went to bed. I tossed and turned for hours, running tonight's and other past arguments through my head, trying to understand how our marriage had become such a mess. I must have finally drifted off, waking the next morning to my alarm. Knowing it was futile, I checked for texts anyway, but the blank screen confirmed my suspicion. A shave and shower helped revive me enough to dress, but it took three times to do my tie. I grabbed a donut and cup of coffee, donned my overcoat, and retraced last night's steps to the Metro.

At least the walk was better than last night's misery, I thought. The lined coat was still necessary, but the snow had stopped, and the wind had died down. Checking my calendar after arriving, I instinctively smiled to see lunch at noon with Oscar Benson, my best friend growing up. Oscar had gone to work with UNICEF after college and had been in Australia and nearby Pacific Islands ever since, working with orphaned kids. It was his first trip back to the States in years, so I was curious what he was doing in town. He'd sent the email a few days ago, saying he'd be in town, but that he'd only have time to meet for lunch. I immediately cleared it on my schedule and replied back with a nearby sandwich shop address.

I used to regularly hear about his travels from my mom, who often lunched with his mom in our home-town of Galion, Ohio. But five years ago, both his parents died in a plane crash on their way to visit him. The last time Bev and I saw him was at their memorial service. Ever since, there was just the occasional email bringing me up to date on his whereabouts and goings-on. It would be great seeing him in person again if only for the lunch hour, just the thing to get my mind off my latest argument. When the time approached, I grabbed my coat and walked the few blocks to our meeting place. I saw Oscar as soon as I opened the door. His bushy red hair had always stood out in a crowd, even though it was a bit more faded than the last time. He still had his slim figure but sadness seemed to mark his face rather than the happy-go-lucky smile, which had always been his normal.

"Lil Joe," he said while we embraced, "it's great to see you again."

Growing up everyone called me that. My older brother, Justin, started it when he was two because he couldn't pronounce *little* and dad was *Big Joe*. Now only family and old friends still call me that, and it always takes me back to a simpler, less hurried time. We placed our order, got drinks, and then grabbed an open table.

"So tell me what you've been up to and why the grim face."

"I'm still with UNICEF working with orphans, the last few years stationed in the Marshall Islands. The islands are in a precarious situation since many are barely above sea level and dropping every year as the surrounding waters rise. Powerful storms now happen regularly; the wind and flood waters kill many, destroy their crops, and foul the drinking water."

"Slow down," I said, seeing how upset he'd become.

He took a sip, a deep breath, and then spoke again.

"Sorry, it's just that since I've been there, hundreds have been killed, leaving many of their children orphaned. Until recently, if both parents died, a grandparent or other close relative would take them in. But as the death toll rose, so has the emigration rate, and those who've stayed constantly struggle to feed their own families. When the number of orphans rose past twenty, I was assigned there to help find them homes."

"I'm so sorry," I said, trying in vain to find something more soothing to say.

"I should have let you know I was there, but there's so much to do that I forget about everything else and just focus on the crisis at hand. There's no real industry, and agriculture has virtually ceased due to the flooding. Now almost all income is tied to fishing or tourism, but even those are struggling since the coral has mostly died off, making it more difficult to find fish either to eat or for tourists to look at. Boats are a necessity for most families to survive, both for food and money. But when a big storm hits, there are few safe places for mooring them. Many islanders seek safety by taking their boats onto the water, away from the storm, but so many have been destroyed—and with them, the islander's best hope for survival."

"In my position, I'm aware of their struggles, but in more of a statistical nature, not the personal issues facing the islanders," I said while he paused to eat a few bites. "Hearing about their day-to-day issues brings reality to the numbers I see."

"Initially, former islanders who'd already immigrated to other places, took in those left orphaned by the seas. But as their numbers grew, we had to build a structure to keep them safe while we tried to find them homes. We built it raised to keep them safe from flooding, but last month, typhoon Neki hit the islands and its high winds destroyed it, killing three of our children. Several more islanders were killed, leaving eleven more orphans."

"I read about how terrible it was. If I knew you were there, I'd have tried to help somehow."

"I can't get those three off my mind, I was responsible for them. I constantly second-guess myself. Should we have built the orphanage somewhere else? Why didn't we make it stronger or evacuate to somewhere safer? I can't sleep anymore without pills. All these kids see is misery and devastation, and they don't even have a parent to hug when they need them the most. Now they're sleeping under canvas tarps without walls for protection from the heat, bugs, and rains. I'm worried that if another storm comes, more will die. Safe drinking water and food are scarce, so they're often hungry and thirsty. Sickness is common and I worry we'll lose even more to disease and malnutrition." He stopped, tears in his eyes.

I reached for my drink, feeling a giant lump in my throat. "Tell me how I can help," I said when I could finally talk again.

"The reason I'm in town is to get funding to rebuild the orphanage, as well as medical supplies, food, and safe drinking water. The State Department has emergency funds, which I'm trying to get channeled quickly. UNICEF usually has someone else handle this, but they've had so many demands on their resources, it's now part of my job. I'm still learning the ins and outs, so anything you can do to speed the process would be a godsend."

I took another bite of my sandwich, thinking that this was another of the constant reminders of the climate change reality I see in my work. I'd tried to explain this to Bev as the reason I work so much, but for whatever reason, I hadn't gotten through to her. I wished she were here now; Oscar was proving so much better at describing the suffering.

"Who are you working with at State?"

"Pete Mason, he's been a big help on the phone and says he can get things done quickly. Once funding is approved, he'll get me a list of FEMA people to contact directly for the supplies: food, water, medical, sleeping bags, and the like. After my meeting with Pete, I've got an appointment with the Red Cross to start their emergency assistance, and then I'm flying back and doing follow up from there."

"I have contacts with FEMA. I'll help expedite," I said. "Send me your list of supplies, and I'll get as much as possible on your flight back."

"Here's the list, but you won't get anything out today," Oscar said, punching the keys on his phone to forward it.

"We'll keep our fingers crossed," I said, already thinking about who to contact.

"Enough about my problems. How are you and Bev doing? Does she still brighten your day with her beautiful smile and those dazzling hazel eyes?"

I took another bite of my burger, thinking about how much to burden him with. Not finding a way to sugar coat it, I began, "We're both fine physically, just a little tired from overwork. But honestly, our marriage has hit a snag lately. We almost never see each other, and when we do, we either argue or keep quiet to avoid arguing. Bev hates it when I talk about work, or worse bring it home, but it's so important, that I struggle to talk about anything else. Lately, she's started talking about wanting to buy a house, but I haven't been able to think about that on top of everything else. So when I don't pay attention to her house hunting plans, she gets even more irritated. Last night she finally had enough and went to her sister's to think things over."

"I'm sorry to hear that. You guys were so in love while you were dating and first married; it's hard to imagine it's changed so much. I know in my work anyone who gets involved with the kids quickly has their heart open up. Long hours and total focus on them becomes the norm. Does she understand how your work affects so many people's lives and the same thing happens to you?

"I think it's too abstract for her. She was interested at first, but my constant talking about it soured her after a while. Plus, the projects take so long it's hard to show tangible results. I started traveling a lot and couldn't keep up unless I brought work home. So she started going out with friends whenever I did that."

"I know how much you love each other, so keep trying; she's worth it. I wish I had more time to talk. My flight is right after the Red Cross meeting, so this will have to be so long till the next time. Give Bev my love when you two get back together, and pay more attention to her, or you'll have to answer to me," finally showing a smile. We stood, hugged, and promised updates.

After we parted, I looked up Ralph Virden's number. Ralph is in charge of FEMA's international operations and would know who handled the Pacific Islands. I introduced myself, then told him about Oscar's desperate need for basic supplies and manpower to help rebuild the orphanage. "I'd like as much as possible on his return flight this afternoon. I know it's impossibly short notice, but there are fifty children with immediate shelter, food, water, and medical needs."

"We keep emergency supplies in our basement storage. I'll grab some people, pick out what we've got from your list, and contact his airline for enough space allocation. Our rep for the islands, Myrah Highley, will follow up on that end for longer-term supplies and staffing for the rebuild."

"I owe you one. Let me know if I anything comes up so I can get it straightened out." I hung up, then started walking back to the office thinking about Oscar's dilemma. I didn't get far before my thoughts switched to Bev.

Chapter 2

I awoke to bright sunlight shining through the window. I was in Rita's spare bedroom after being up half the night talking with her about my marriage woes. She took the stance I'd given Joe too many chances already and should leave him for good, especially since I eventually wanted a family. Since we argued so often, it proved to her we shouldn't have kids together, and I should find someone else.

"You're not getting any younger," she must have said a dozen times, "not that thirty-five is too old to have children, but it'll take some time to find the right someone."

But in my heart, I know I love him and I'm not ready to give up on us just yet. I briefly thought about calling just to hear his voice, but I hadn't decided what to say yet and wanted to give myself more time to think about it. I showered, dressed in the slacks and blouse I'd packed, and then came out to the kitchen. Rita had already gone for the day but had left a spare key and note to help myself to whatever food I could scrounge up. Finding a frozen breakfast burrito, I popped it in the microwave to eat on the way to work.

I'd been working at a client's this week with a co-worker, Robin Schwartz, preparing them for an audit. We worked for a CPA firm specializing in tax issues and regularly team up. Robin was in her early forties; her husband of twenty years was a dentist, and their son, Jimmy, a high school senior. She had a small build like me but black hair that she had to dye to avoid showing the grey. But our main difference is that she's an out-going people person and loved schmoozing with clients, while I liked to come in, get the job done, and then leave. I could scan their files, run all the numbers, and then organize folders for the auditor in much less time if I don't have to chit-chat along the way. Plus, I don't make mistakes listening to their endless stories about little Susie's recital, pet cat shenanigans, or the latest game of the century.

As usual, Robin was chatting when I arrived, so I picked up where I'd left off the day before, entering monthly accounts receivable, debits, and credits into spreadsheets. After an hour I checked my entrees and found multiple mistakes. Knowing my thoughts had drifted to Joe's thoughtlessness, I started over. This time my mind wandered to the latest item on my long list of grievances; moving out of our tiny apartment and into a real house. But whenever I brought it up and suggested we start looking, he'd just drone on about being too busy on his latest project to think about it.

"This is hopeless," I finally said to Robin after rechecking my entrees. "I can't concentrate on mundane numbers with so much else going on. Let's take an early lunch."

At the deli down the street, I filled her in on my latest saga.

"All you seem to do lately is fight, but you've never left him before. What's different this time?"

"It's been building. I've been fed up with our relationship for a while, so I just had to do something. Deep down I think I still love him, but I need to figure out if he's worth another try."

"I think you two just need a weekend getaway to recharge your relationship. Find somewhere to escape and just have fun. With this weather, fly to the Bahamas, drink lots of rum, and have sex on a secluded beach. That should fix any relationship."

"Yeah, but when we get home things will go back to the way they are now: Joe working all the time and us fighting."

"Make some ground rules, no working night or weekends," she answered.

"We've tried that several times," I paused, taking the first bite of my pastrami on rye. "It works for a few weeks, but gradually things revert back. Some hot project comes along so he's got to put in extra hours, or he goes out of town for a week then has to catch up. I'm taking a last shot trying to save our marriage. I just hope leaving is a step in the right direction, not a step towards a divorce lawyer."

"Maybe that's part of the problem, you're trying to work it out, but Joe's not. He needs to do his part too," she said after a few bites of her salad.

"What magic will make that happen?" I said, rolling my eyes.

"Won't he miss you? Zeke would be lost if I left."

“He barely notices me when I’m there. He’s probably loving being alone—he can work even more.”

“Are you sure he’s not having an affair?”

“I thought about that, but I haven’t seen a single sign, and believe me I’ve checked. No suspicious credit card receipts, phone calls, or texts, and he sure hasn’t been exercising to impress anyone with that growing pot belly.”

“He travels so much; maybe he’s got something going with a co-worker. You’ve told me he seldom calls when he’s gone.”

“I’ve gotten to know his executive assistant, Tina. We have lunch every so often, and she tells me he’s so totally focused at work, it’s kinda freaky. Not so much of a hint of womanizing. And when he’s away on business, she’s even busier than usual with his requests for reports, data, and background information. He even sends her emails at all hours of the night.”

“Well I hope you get something resolved quickly; you aren’t getting a thing done here. Soon I’ll need to start doing your work and mine.”

“You can have it. Frankly, I’ve been tired of doing tax stuff for a while now; it just seems so inconsequential. This fight with Joe is just the latest thing to make me feel this way,” I said as we finished and headed back to the office.

“Are you thinking of doing something else?” She asked.

“That’s next on my list as soon as something gets resolved with Joe. I’ve stayed in touch with my old college advisor from Pitt; she’s doing some interesting stuff and always has openings. She’s told me I could work from here, but if Joe and I don’t work out something, I may just move back there.”

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That night at Rita’s, we talked while she got ready for bed.

“I like the colors in here, but is yellow too bright to sleep with?

“It makes me feel happy when I wake up, especially on the weekends. I just lie in bed feeling warm, like the sun is in here with me,” she answered.

“That’s another thing I hate about our apartment; all the rooms are a boring off-white. I’ve thought about adding some color, but I want to wait until we get a house. Then I’ll pick out furniture and window coverings to match.”

“So you’re not going to leave him for good like I keep telling you?”

"I decided to give it one last try. I'm going to make him miss me enough that he'll finally make some permanent changes."

"How long do you think that'll take?"

"I wish I knew—how long can I stay with you?"

"As long as it takes. Lucas is working an extra shift at the plant and is too tired to do anything else. If we do get together through the week, it's just to watch some TV, and he usually falls asleep on the couch. He says he's saving for a new pickup, but I wonder if it's for a ring."

"Are you guys that serious?"

"I'm not sure, but I better start deciding just in case."

I went to bed thinking about her question: how long would I wait? What if Joe wasn't willing to make some changes?

Bedtime was the hardest part of being separated. I loved sleeping with Joe, not just the sex, but his closeness feels so warm. He usually held me till I fell asleep, and often I'd still be in his arms in the morning, snuggled deep into his chest. Feeling especially lonely, I thought again about sending him a text, just saying hi. *No*, I told myself*, don't do it*. I need to stick to my guns, or I'd go back to the same old problems. Switching on the light, I picked up a book. But after a few already forgotten pages, I picked up my phone and began typing. Coming to my senses before I hit send, I went to find Rita and offer her ice cream to watch a movie with me.

Chapter 3

I stayed at work even longer than usual, knowing Bev wouldn't be there when I got home. Even though I had to finish preparing for an important meeting, I couldn't concentrate on anything but her. How could I convince her to come back if she wouldn't even talk to me? I finally left but stopped on the way for a late dinner at one of the few places still open. It was almost eleven by the time I got home and climbed straight into bed. But like last night, I couldn't sleep. After an hour, I turned on the light and looked for one of Bev's magazines to make me drowsy. I found one on home decorating, reminding me about her latest attempt to get me interested in moving with color schemes. I vowed to listen closer the next time she showed me her ideas, if I ever get the chance. Maybe the guys at poker tomorrow night would have some ideas on how to improve my odds.

The next morning, I did my rituals in deafening quiet. We usually got ready together, so the absence of Bev's everyday sounds had me feeling especially alone. The melancholy of the moment caught up with me while shaving where I found myself uncharacteristically scrutinizing my appearance. My short brown hair, just a bit longer than a crew cut, has greyed on the sides, but the shortness hides the beginnings on top. I have matching brown eyes with a nondescript face, except if I look closely enough, my ears stick out slightly. After rinsing the shaving cream remnants from my razor, I began the shower but noticed my potbelly in the mirror. I'd never been thin, more of a medium build, but the belly had become more pronounced every year since turning forty, now almost three years ago. I turned off the shower, laid down in the hallway, and grudgingly did fifty sit-ups and twenty push-ups. I was sweating and sore by the time I finished, but the fatigue made me feel a little better, and I'd stopped thinking about Bev. I vowed to make it a morning ritual until the belly shrank some.

On the way to the office, I thought about my up-coming day to keep my mind off Bev. I'm an executive director at the Department of Climate Change, or DoCC, a fairly new federal agency created at the start of the just-ended, two-term McGregor administration. We're located in the old General

Services Administration buildings, just a couple of blocks from the White House. Since climate change was the defining issue of McGregor's candidacy, he wanted us nearby.

I hired in at its founding from my previous job as director of engineering at WTE, a leading company in the design and manufacture of wind turbines for power production. My initial assignment at the DoCC was to lead the program to fully convert power production away from fossil fuels over to renewable sources. After four years, I was promoted to head of the New Projects group and the renewable project was transferred over to Susan Wainright's Current Projects group, where it's now nearing completion.

I was a hands-on kind of manager and seemed to better understand a project's complexity and guide my team if I was an active participant. Plus, I still enjoyed doing the technical work. I needed to do the managerial tasks like making presentations, holding staff meetings, approving expenditures, and putting up with the endless travel, but my heart was in the analysis part of the job. This was at the core of my marriage problems; I needed to spend a lot of hours each day to fit everything in regardless of whether I'm at the office, on the road, or at home. I'd tried to delegate some of my work a few times before; but whenever something new came along, I got so consumed with its details that I'd forget everything else, including Bev.

It was happening again, and Bev knew it. The incoming Hawkins administration was changing the department's focus. Since most of our programs to date have dealt with reducing emissions at their source, Hawkins rightly felt it's time to focus on reducing the vast amount of carbon already put into the atmosphere from over a century of burning fossil fuels for transportation, heating, and power creation. Susan's division would handle the existing emissions reduction projects so my department could focus on carbon capture and sequestration, as it was formally known. It's not enough to just remove carbon; we had to make sure it didn't get reemitted. The report I was working on the night Bev had left was a summary of what we were recommending to the new president in tomorrow's staff meeting.

When I got to the office, I called a meeting of the team who'd put together the report. This was a group of my twelve best, but I knew, even with their expertise, we'd struggle to get through the action items I'd come up with by tomorrow. There were several items requiring further analysis so we paired two analysts on each. The others, along with Tina, my executive assistant, were to gather additional background, incorporate my edits into the final report, and then add the new analysis results as they finished. I would prepare the executive summary and presentation materials while keeping tabs on how the analyses were going.

We worked through lunch, so by the end of the day the analyses were complete and the report updated with the new results. I had nearly finished my tasks, just needing to make the final recommendations, but I'd finish them in the morning since it was time for my weekly poker game. As I was leaving the office, I spied Mitch Evans, one of the other players from the department. We boarded the train to Landover, where tonight's host, Rick Clarkson, lived. We alternated poker sites between the other five players, but since our apartment wasn't big enough, I put extra money in the beer and snacks pot to make up for it.

When we got to their two-story brick Colonial, we ran into his wife Jane, just leaving with their two pre-teen kids, Marsali and Jasper. Jane asked about Bev, and I mumbled something about her spending time at her sister's. The four of us got together occasionally for a bridge game and Jane and Bev had become friends.

"Everyone's in the basement, just go on down" and she waved goodbye.

Rick's set-up in the basement is perfect for our games, a large poker table, big screen TV with a game always on, stocked fridge with a large selection of beer and sodas, and a bottle of Jack to mix with. Mitch and I were the last arrivals. Barry Hill, another co-worker, was at the bar and asked what we wanted.

"Guinness of course," I said, and Mitch asked for a Lite.

Tejinder Kheri, a neighbor of Rick's, and Jayden Billings, a friend of Mitch's, were already seated at the poker table, drinks in hand. The Wizards pre-game was on the big screen.

"Jane made sandwiches in the fridge whenever anyone's hungry for something besides chips," Rick said, shuffling the cards. "Let's get this show on the road."

After about an hour, Rick said he needed a smoking break. His chip pile was down and I'd noticed that when he was on a losing streak, he'd often sit out a few hands to light up and try to change his luck. Wanting to talk to him about Bev, I joined him. He was the only smoker in the group and usually lit up one of his pipes. He picked up the habit from his dad, who always had one going, and got hooked on the aroma. Jane doesn't let him smoke in the house, so we went into the adjacent garage, which he used for his woodworking hobby.

"Looks like you've been busy," I said, looking at several partially completed pieces.

"Yeah, too busy," he said, picking out a pipe.

He had a large collection and selected one with tiny carved Roman heads on the stem and the bowl in the shape of a ewer. He partially filled it with tobacco and lit it, sending a slightly acrid smell across the garage.

"One of the guys from work and his wife wanted a bedroom set done by Easter, so I'm out here several evenings through the week plus most weekends when the kids don't have something going on. I don't usually do jobs this size, they take too long with my tools. But they gave me the better part of a year, and with the money I'll make, I'm going to get better equipment. I've started teaching Jasper some of the basics, and he seems to like it."

"I bet it feels great to work with your son on something like this," I said, noticing a headboard taking shape in one of the rough-cut boards.

"Maybe Marsali will also take to it in a few years. My dream is to quit my factory job and open up a furniture making shop when they finish high school."

I couldn't figure out a good way to mention Bev's leaving, so I finally just blurted it out, catching Rick by surprise.

"I just hadn't been paying enough attention, and she got fed up. Now she won't even talk to me, and I'm going crazy."

"Sorry to hear that," he said, after the shock wore off. "Sounds like you really miss her."

"It's strange, I ignored her for so long when she was there, but now that she's gone, I can't quit thinking about her."

“Yeah, love’s funny that way, but I bet she’ll eventually cool down, so you’d better be ready. Have you got something in mind?”

“Flowers, diamond ear rings, and lots of groveling,” I answered, listing the items I’d been tossing around in my mind.

“Well, it’s a start,” he said, cleaning out his pipe. “But since you said the issue is not paying her enough attention, seems you ought to do something about that too.”

“I’ve thought about a few other things; maybe I could swing a weekend getaway next month.”

“Next month? What’s your hurry, why not next year? Or better yet, you’ll be retiring in about twenty; you could shoot the moon and go for a whole week then.”

“It’s just a bad time right now, but I could swing a week in the spring—maybe take her to Florida or on a cruise.”

“Well if that’s your plan, you’ll soon have all the time in the world for work ‘cause she’ll still be at Rita’s and probably looking for someone who’ll pay her some attention. She’s an intelligent, beautiful gal, so it won’t take too long. Take it from an old married guy; she wants your attention, not your trinkets. I imagine it took years of taking her for granted to get to this point, and you’re not going to convince her you’ve changed with a few days in the sun.

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The game was still going strong when we got back. Fittingly, Rick won the next hand and got back to even. I lost more than I won and ended up fifty bucks down for the night. But during the evening, I kept thinking about Rick’s advice, especially the part about her wanting my attention. Even though it was late when I got home, I lay awake for hours, thinking about how empty the bed felt without her. But in between self-pity, loneliness, and angst over Bev leaving, I pulled together the workings of a plan to win her back.

The next day I began putting it into action by scheduling a late afternoon meeting with the managers who report to me, and then asked Tina to come into my office. “I need to clear up my schedule so I can spend more time with Bev. I’m going to leave the office by five, so no meetings after four unless you clear it with me. Remove my weekly HR meetings; I’ll be delegating those to my managers. Shorten my staff meeting to two hours and remove the standing Thursday afternoon meeting with the Current Project staff since we cover most of it in Jennifer's staff meeting."

She offered a few of her own suggestions on what else I could take off my plate, and then left to start on them. I finished the project recommendations, did a walk through, and then headed to the meeting that had caused Bev to leave.

The presentation was on the top floor in the conference room adjacent to the Department Secretary, Charlie Peters. I arrived first and took a seat near the front as others started coming in. The first group was Charlie with the rest of his staff. A short time later, I stood when I saw President Hawkins, Vice President Shirley Boswell, and Chief of Staff Bianca Roselli enter. The president had been a regular at many of my presentations back when he had been vice president under McGregor. I suspected Charlie had already brought him up to date on my material after last week's staff meeting where I'd reviewed preliminary results. Since he was detail oriented when vice president, I expected in-depth questioning along with much discussion.

"Good afternoon Joe, nice to see you again," he said as we shook hands.

"Good afternoon, Mr. President."

"I trust you're on board with our new direction," he added.

"Yes, Mr. President. It's the right time to switch to carbon capture."

"Good, it gives me confidence knowing you feel that way. I'm looking forward to hearing your recommendations so we can get them started."

Charlie nodded at me to begin.

Our team had done preliminary analyses on several projects, and I reviewed each one. I gave specifics such as projected yearly carbon capture, sequestration method, timing, resources, expected issues, and cost. Following each was a recommendation for either advancement or rejection. Most were recommended for the more detailed analysis phase with a few for outright rejection. Only one was without a recommendation, pending discussion.

Next I reviewed our target and conclusions. Last year at emergency global conferences, the U.S., along with all other countries, committed to a two-part goal. Part one was to achieve net zero emissions by 2052. With our emission programs planned or already in place, we were on pace to stabilize at one billion tons (gigaton or GT) by then. Since our recommended carbon capture projects also totaled one GT, we were on target there. But part two was the issue—within five years after net zero, we needed to be removing ½ GT annually.

“So we can’t meet our pledge unless we figure out how to do the desert afforestation project,” the president clarified after listening intently to my spiel.

“It’s so complicated,” I replied. “It provides the largest opportunity for carbon capture but has several big issues. One is land ownership. It’s a mix of public, private, national parks, protected lands, and Native American reservations with millions of people living there. But the area is so vast and desolate it had to be looked at.

“Next are the potential environmental impacts. We aren’t considering anything close to full forestation, but it’s illustrative of the potential issues. With that extreme scenario, desert vegetation would eventually be replaced by forest-like flora. The total loss of desert habitat for the indigenous wildlife would cause the extinction of countless species and endanger many more. Many migratory birds and butterflies important for pollination would lose their habitat. Indigenous people living in the rural areas would be affected since they rely on the desert for sustenance. And the desalinated ocean water for irrigation produces high concentrations of salt, which we can’t just put back into the ocean at these quantities.

“Resources are another big issue. Providing the energy to desalinate that much water and then deliver it hundreds of miles to irrigate billions of trees in a desolate desert is a huge undertaking. It’s comparable to some of the largest projects in our country’s history, like the transcontinental railroad or the interstate highway system. Preparing the land to make it hospitable will take an army of railroad cars full of soil, fertilizers, and other enhancements. Irrigation will require thousands of miles of ditches, piping, and multiple pumping stations. Planting, harvesting, and delivering water to the trees will take specially designed machinery. The start-up costs will be tremendous.”

“Is there something we can do to help offset the cost?” the president asked.

“Partially. The tree we’re considering produces oil, which can be economically made into biofuel. To sequester the tree’s carbon capture, we’ll use the trimmings and replace entire trees to produce a type of charcoal that can be sold as a soil enhancement. The desalination brine can be processed into a wide range of industrial products. These offset much of the operating costs once the project is up and running.”

“What percentage of forestation are you considering?” the vice-president asked, studying my charts.

“There’s the rub, our models project 20 percent maintains desert conditions with no significant loss of vegetation, wildlife habitat, species endangerment, or displacement of indigenous people. When we exceed that amount, desert vegetation starts being replaced by different varieties, wildlife becomes strained as other species move in, and hardship begins for people depending on the desert. But 20 percent barely gets us half way to our commitment. We need 33 percent to meet it.”

“Can’t we increase the scope of the other projects to make up the difference?” she countered.

“It’s too early to know for sure. Our preliminary analysis provides a range of carbon reduction based on many factors. To ensure we meet our target, we’ve used a high confidence value. If we use lower confidence, the capture amount goes up, but the risk of not meeting it also goes up. As an example, let’s take our mineral sequestration project.” I quickly summarized the basic process of pulverizing carbon-absorbing minerals then spreading them so they’d dissolve, depositing their captured carbon into the soil and water.

“If we spread the grains thick enough over the entire countryside, we wouldn’t need any other project, but crops and grass wouldn’t grow. A smaller amount has proven beneficial, so we’ve been doing trials to determine the optimum amount for various environments. Until then, we’re using a conservative amount to make sure we’re successful. If tests show we can do more, we’ll increase it.”

“Your team recommends rejecting other geoengineering projects like partially blocking the sun’s radiation, why didn’t these make the grade?” Roselli asked.

“No one wanted to use the desert, so we studied the options with an open mind. Some have never been tried, so we’d need to do a complete evaluation and trials which would take several years. For instance, when we looked at installing a porous roofing material over the polar ice caps to allow snow to penetrate, but block some solar radiation, the global climate models showed inconsistent results and the logistics and long-term viability proved too difficult to resolve.

“Seeding the atmosphere with sulfate aerosols was also studied, but it would need to be done in perpetuity, which was prohibitively expensive compared to the other options and carried high risk if curtailed in the future since GHG levels would continue to rise.

“Instead we completed a study on another option yesterday, expanding the desert project to include the northern Mexican deserts adjacent to ours. The combination produces the needed amount at the safe 20 percent forestation.”

“But the U.S. wouldn’t get credit for it, Mexico would.”

“Yes, Mr. President. But we don’t think Mexico would do it without our project providing easy access to their desert lands. It would be prohibitively expensive for them to irrigate through the mountains, so the carbon capture would get done even though they would get the credit.”

“But you already show huge levels of resources required just for our deserts. Adding more increases resource levels even further.”

“Our analysis assumes Mexico would provide their portion and possibly more due to providing them access. And sharing resources actually helps reduce our costs,” I answered.

“Interesting, what gave you this idea?”

“I’d love to tell you it was the result of studying maps and data for days, but in reality, it just came to me. I guess you could call it luck.”

“As the saying goes, you make your own. But just in case, don’t lose your rabbit’s foot; we’ll need it for these projects. You’re right to think about cost. It’s a big issue for these carbon capture projects. We had it easy with our emission reduction programs; they actually saved money. Now we'll need to use some of that money on these programs, and creative ideas like this help offset them. We still need to figure out how to reach our commitment without harming the desert, so keep studying it, but the Mexico idea is quite intriguing, so I'll pursue it further.

"Charlie, I'll need a time line within a month when the detailed science phase will be completed and implementation ready to start for each project. I'm going to make an announcement for each project to let the public know how they can help make it successful. This was critical for President McGregor on emissions projects, so I'm going to continue the practice on these. The public is still gung-ho and wants to be a partner in these actions. They were instrumental in our emissions projects, and we'll need to rely on them again."

"Certainly, Mr. President," he responded, looking at me with an expectant expression.

The president left, but the staff meeting went on for hours, planning strategy to meet his requests. How successful would my plan to spend more time with Bev be with so many new projects to manage? "Delegate," I kept muttering to myself, "delegate."

Tina and my three managers, Katrina (Kat) Vogelsong, Mason Porter, and Tricia West were already in the conference room when I finally showed up. Kat managed the implementation teams, Mason did the analysts, and Tricia handled communications to the other departments. I began by bringing them up to speed on my report out.

"We need to stage the projects to make the best use of our resources and optimize when each can move to implementation. We'll need to factor in the existing emissions projects then combine their time lines to figure out their sequence so we hit net zero by the required date. Charlie gave approval to hire more resources, so let's immediately post in-house openings to see how many want to transfer into our group. We get their training started right away and begin hiring from outside to backfill for them.

"The last item is policy changes for our group. With so many new projects, I need to delegate more to keep my sanity and a happy marriage."

I reviewed the items that Tina and I had discussed, ending with my reduced travel.

"I'll believe it when I see it." Kat chuckled. "I think American keeps a permanent seat open for you on every flight out of DC. I still don't know how you manage to get out at the last minute so often."

"I have Tina to thank for that. Cutting travel will be the most difficult change for me. I love going to installations to see their progress. It's concrete and lets me know something, besides studies and models, is being done. But it's even more important to go to disaster sites. They keep me motivated for the times I'm feeling safe and cozy in my office. I don't ever want to forget it's the reason we're here. I want you and your staffs to set up a rotation schedule for traveling in my place."

After answering the rest of their questions, I headed back to my office to continue my plan to win Bev back. I searched ski resorts for a getaway weekend. We used to ski a lot when we were dating, but we hadn't gone in years. We'd need to rent equipment since in our last move to be closer to my work, we no longer had room for our old gear. I bought on-line lift tickets at a resort in eastern Pennsylvania only a few hours away by bus, and I found a romantic Victorian bed and breakfast in nearby Chambersburg. On the way home, I stopped at a jewelry store and found the perfect pair of diamond earrings. They had a snowflake design with small diamonds on the outer edges of the flakes. Afterward, I stopped at a book store to find some better reading material for my sleepless nights. I mostly looked for something long, not knowing how long till Bev finally would talk with me again, much less come home.

Chapter 4

I got Joe's text at one a.m. Saturday while watching an adventure movie with Rita and Lucas.

"I miss you so much. Take your time, but please give me another chance. Love, Joe."

"Why are you grinning like you won the lottery?" Rita asked.

"My plan might be working. I think I'll chat with Tina tomorrow to see if Joe's said anything at work.

The next day, Tina answered my call on the first ring. "Bev, I'm so glad you called. How are you holding up?"

"Fine. So you've heard?"

"Yeah, Joe's been acting like a sad little puppy dog ever since you left. I never knew he had such deep feelings."

"What else can you tell me?"

"Just between you and me, make some room in your jewelry box and keep your schedule free. And you wouldn't believe all the changes he's made to free up his time. He's nearly down to a forty hour work week."

"So you think he's serious this time; it won't be like the last dozen where it only lasts a month and then he lapses?"

"I'm not making any guarantees, but he's sure acting different this time."

"Thanks, I owe you big." Hanging up, I nearly ran to find Rita with the news.

"Good, now you'll finally talk so Lucas and I can have our privacy back," Rita joked while she hugged me.

"You two don't need privacy, just a muzzle to drown out his snoring."

What should I do next, I started wondering. *Wait a little more and then call, or should I just go home*? Even though I was ready to be home; I knew that wouldn't work, he'd be getting off the hook way too easy. Calling didn't feel right either. We'd both apologize, and in a hot minute it'd be over. I decided to give it a couple more days to make sure he really got it, and then text to set up a nice dinner. It wouldn't hurt him to preen a little for me; he could still look good when he tried.

So on Tuesday, I texted, “If u still want to talk, dinner tomorrow nite at 7. Italian place near Rita’s”.

I got to the restaurant a few minutes early, asking the hostess for a quiet table near the back. On the way, I noticed the Italian-themed murals covering the walls that Rita had told me to watch for. I wasn’t up on my Italian architecture but recognized the Trevi Fountain and Coliseum among the many structures, all intertwined with lush purple grapes. While scanning the menu, aromas from the kitchen made my mouth water, igniting my hunger. *He better not be late.*

A few minutes later he was there. He had on my favorite blue pinstripe suit with a freshly ironed white shirt and matching blue pattern tie. His hair was freshly trimmed, and he even seemed a little leaner. He looked darn good. The hostess had the chair opposite me pulled out, and I could tell Joe wasn’t sure if he should kiss me or just sit. I didn’t let him off the hook, so he finally sat, and then I noticed the bouquet of red roses he was holding.

“You look great. I’m so glad to see you,” and he handed me the flowers.

“These are beautiful, and you look nice too,” I managed just as the waitress stopped back for our drink order.

“A bottle of the house red,” Joe said.

“It’s Brunello di Montalcino, from the Tuscany region. My favorite for special occasions,” she said. “Are you celebrating?”

“Just a night out,” I said. “Plus an order of bruschetta, I’m starving.”

“Did you miss lunch?” Joe asked after the waitress left.

“Robin’s on a diet, so I just had a salad to commiserate with her. Plus the garlic I’ve been smelling has me ravenous.”

“I love your dress. It must be new; I don’t recognize it.”

“It’s Rita’s. We’re close enough in size that I went through her closet to pick something out. I loved this shade of purple.”

The waitress returned with the wine, poured us each a glass, and reviewed the specials.

“Do you know what you’re going to have?” Joe asked after we’d browsed the menus for a while.

“I have to get something with garlic or I’ll start foaming at the mouth, so I’m going with garlic shrimp linguini.”

"As soon as she mentioned the veal parmesan, I was hooked."

After the waitress took our orders, Joe reached for my hand.

"I want to start by apologizing for being such a lousy husband. I've been soul searching and understand why you left. We were just going through the motions—at least I was. I'd gotten so wrapped up with work again, I'd forgotten how good we are together. So I've thought long and hard how to do things better and made several changes. I'm delegating much more to my staff and cutting way back on meetings. I'll only travel when absolutely necessary, and if you can get away, we'll extend it over the weekend to do some sightseeing. No more working from home, except true emergencies. There may be an occasional slip, but I know the problem, and I'm fixing it."

The bruschetta arrived, and I took several bites before responding.

"I'm glad to hear you're making that commitment, but that's just part of it. I've been doing a lot of thinking too. We've talked about starting a family someday, and it'll need to be sooner rather than later at our ages. I need to figure out if we're still right for each other so when we're ready to have kids, I'll be sure we stay together. With your routine, I'm concerned about your long-term health: not eating well or getting enough sleep, never exercising, and constantly under stress. Since you're several years older, I don't want an incapacitated husband when our kids are still in high school. They'll need a father then too. I need to know you'll be there for them and me. I left because in my head I already knew the answer, but I needed to figure out how my heart felt."

We finished the appetizer and sipped more wine, before Joe spoke again.

"I was really lonely getting ready in the mornings, but the nights were so much worse. That's when I realized I loved you more than anything and couldn't believe I was risking the best thing in my life. When we decide to have kids, I'll be there for them and you. I want us to be a family, being apart nearly tore me up. I'll start eating better, no more working through lunch then eating chips with a soda or cereal for dinner. I'll figure out how to get some exercise in; I've already started doing a little. If you let me, I'll show you this time I really mean it."

Our food arrived, and I ate a few bites letting his words sink in.

"I don't mean this to sound like a bargaining chip, but I'm ready to move out of our ridiculously small apartment. It just feels so temporary, and I'm ready for some permanence."

"I know how important that is to you, so I've been checking out the areas near the latest Metro expansion, and there are several new neighborhoods and subdivisions going in," he said after taking another sip of wine.

"Can I can have a bite of your veal?" I asked. "It looks delicious."

"If I can have some of your shrimp. You know I like garlic almost as much as you."

Over our second glass of wine, Joe gave me a small gift-wrapped box.

"Earrings, how beautiful," I said then looked at them closer. "In the shape of a snowflake? What a perfect way to commemorate this winter. I'll think about blizzards whenever I wear them."

"Hopefully this will help us enjoy the snow instead of dreading it," and Joe showed me lift tickets. "Plus, I found a quaint B&B nearby if you'll still have me."

I stood, walked over to his chair, and gave him a long kiss.

"I'm ready to try one more time, but I don't think we can survive another setback. We need to make it work this time," I said as we broke our embrace.

"We'll make it work. I've never been more sure of anything. Now I want to ask you something. I had lunch with Oscar a few days ago. He was in town for the day, and the story he told me about his orphans in the Marshall Islands nearly broke my heart. He was in tears, and it's haunted me since. Their stories are the reason I became such a lousy husband. Devastations happen to people the world over, most places much worse than here. That's the reason I work so passionately. I've never been able to adequately describe it, so I need to show you. Since climate disasters happen so regularly, will you come with me to see how they devastate a community? Seeing it first hand is the only way to fully understand its impact; TV and news coverage don't do it justice."

This surprised me, but after a long pause I said, "Okay, you're making a lot of changes, so this is one I'll make. Maybe if I understand better, it'll help me pay more attention to the things going on in your life."

After paying the bill we held hands and talked all the way home. While drinking another glass of wine, we started kissing on the couch. We ended in the bedroom, undressed, and climbed into bed. Our lovemaking was tentative, but at least it wasn't mechanical like it had been for so long. Maybe soon we'd get back to passionate like we used to be.

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It didn't take long for the next disaster. On Sunday, dozens of tornados ravaged central Georgia. We followed the news reports and were saddened to see so much destruction from the storms. One of the worst hit areas was the town of Sylvania, near the South Carolina border. Two trailer parks were in their path, with both sustaining heavy damage. Remarkably, only fourteen people died across the state, six from Sylvania.

Joe made arrangements for us to leave on Tuesday morning. The weather there was still chilly, so we shopped Monday after work for boots, water proof jackets, extra socks, and sweatshirts to prepare for any outdoor work we might be doing. We got extras of everything to take along for anyone who might need them. Wednesday was the scheduled memorial service for the people killed in Sylvania, so I packed my plain black dress that I wore for solemn occasions. But questions kept popping into my mind while I packed. What could I do to help people in a small Georgia town devastated by tornados? What comfort could I provide to the surviving families?

Joe assured me that we would be of some help. "You'll get to see one of our safety centers in action. They prepare for emergencies like this, but they can always use more hands when a disaster hits."

Tuesday morning we flew into Augusta, the nearest airport, and were met by John Riverton, the center leader for the Sylvania area. He looked to be in his late fifties with greying black hair and a significant pot belly. He was dressed in work jeans, a Georgia Tech sweatshirt, and clean but well-worn sneakers.

"It's more than an hour drive," he said. "I've packed our electric SUV with supplies from our regional center; hopefully, it's not too cramped."

As we drove, John described the tornados devastation, pointing out areas where touchdowns occurred. "There were ninety reported touchdowns between Macon and Augusta with the strongest winds almost 250 miles per hour. We've been hit by tornados before but nothing like these. They seemed to form in an instant, touchdowns everywhere. Everything outside not tied down was transformed into a missile. If you were in its way, you either ended up in the hospital or the morgue. I've never seen so many fallen trees and downed power lines."

"Look at those smashed cars," Joe said, pointing out his window. "I've seen cars moved before, but never so far off the road."

"Me neither," John concurred. "But what struck me most were the number of houses that lost roofs and windows, but the worst hit were the mobile homes; they didn't stand a chance. Two parks were directly hit, with most trailers there either heavily damaged or totally destroyed. Mobile homes are one of the main focuses of our center because of the heavy damage they usually get from a tornado. There just isn't anywhere to safely shelter in one. So as soon as there's a tornado watch in the vicinity, the parks' sirens sound. We let everyone know to prepare to evacuate. We warm up the school buses donated by local districts and contact drivers who have volunteered when a tornado threatens."

"How do you communicate fast enough to so many people?" I asked.

"Apps and lots of practice. The app sounds an alarm on their phone, and when they swipe, it shows our message. If it's a watch, like on Sunday, it tells them to prepare. When it turns more threatening, we send another that buses are leaving for pickups at their park. If they need a ride to the center, they reply back and go to the pickup area so we know how many buses to send. If they're disabled or otherwise can't make it, they enter a different reply giving the location where they'll be."

"Did most people evacuate?" I asked.

"Everyone from both parks," he said proudly. "Either to our center, another shelter, or family in a safe location. That's the goal for our center, and we've spent a lot of time getting the bugs out with trial runs. I think it saved a lot of lives Sunday."

"We saw some live footage on the news," I exclaimed. "The blowing debris was harrowing—furniture, clothes, dishes, and paper strewn everywhere. I've never been through a tornado, it scared me just seeing one on TV.

"I've seen way too many," John shook his head and I could see sadness in his eyes. "Georgia seems to get more than her fair share. Growing up, I remember watching one pass just a few houses down. Our whole family stood at the front door as it came up the street. But not anymore; I take them seriously ever since a good friend of mine died when a tornado hit his trailer. It's been my goal to make people feel safe and welcome at our center so they'll come when tornados are in the area. We've got eighty-six people who stayed last night, and most are still there waiting till they can get help with their insurance or repairs."

"We heard there's a countywide blood shortage from all the injuries," Joe interjected. "We'd like to donate."

"The Red Cross will be at the center tomorrow." John said as I saw signs showing we were entering Sylvania. "We'll drop off these supplies then tour the damaged areas."

The center was a new-looking large one-story building. We entered through the outer door into the entryway then proceeded into the building. There were offices on both sides, and the main room was straight ahead. Being lunch time, most people were either in line or eating at one of the folding tables in the center of the room. There were sleeping bags and stacks of clothes piled around the perimeter walls.

"Lunch today is potato soup with grilled cheese. We'll grab something after we unload," John said, already heading back to the SUV.

After a few trips, we went through the food line then sat down next to a family of four, who introduced themselves as the Martin's. "I'm Bill, this is my wife, JoAnn, and our two kids, Gretna and Peter."

"Did the storm do much damage to your trailer?" Joe asked.

"Most of it got blown into a pond; now it's just a big pile of floating debris," JoAnn said as their youngest, who looked about two, began crying. JoAnn consoled him then finished her thought, "When the watch started, we came here like always. I won't stay in a trailer during a storm; I've known too many hurt or killed. This place is safe, and John here is a saint. He makes sure we always get what we need and sneaks special treats for the kids. Tornados have always missed our trailer before, but I don't mind the trip. This time it saved our lives."

"Will it take long for insurance to settle?" I asked in between bites.

"We're meeting with our agent this afternoon. We're not buying another mobile home though; we're using the insurance as a down payment for a house with a basement. The tornado was God's way of telling us to get out of trailers," JoAnn answered as she put her arms around Peter, giving him another hug, and then spooned him more soup.

After lunch we changed into work clothes then headed out to survey the area.

"Have you been with the department long?" Joe asked John on the drive.

"Just had my five-year anniversary; I started when it opened. I'm the former mayor here, born and raised. Went away to Tech for a business degree, but I came back and was in the insurance business before becoming mayor. The center's become my second home and been great for the town. We hold lots of events there, everything from seminars on saving energy to solar panel companies demoing their equipment. Plus we have lots of entertainment like weekend dances and card games. My wife Margie loves to play the piano, so we do a sing-along on Thursday nights."

"Look at that." I said as we came to a street where the north side had several in a row either with roofs missing or entire walls blown away; debris was scattered everywhere.

"Tornados sometimes do that. They'll go in straight lines for a while and wipe out a stretch, but the other side of the street won't be touched."

"There's a large dumpster over at that house—how about we stop to help the owners pick up trash," Joe said, pointing to the heavily damaged home.

As we got out, I saw a couple of girls across the street.

"Buffy," I heard one of them call. "Where are you?"

"Are you looking for someone?" I asked, seeing one of them was red eyed and crying.

"Our poodle, she got lost during the storm. We've been looking all day. Shari is heartbroken, afraid she's . . . ," the girl trailed off.

"I'll help you look; show me where you live. She may be okay, just trapped under some debris."

When I got back, more than an hour later, I found Joe still helping with clean-up.

"Any luck?" he asked.

"No, the two girls are devastated. But at least they're back with their parents, who'd been worried about them since they'd been gone so long."

I helped Joe sort through more debris, keeping what little was salvageable and disposing of the rest. When it was time for a break, I chatted with several nearby home owners.

"We just do what needs to be done so we can get back to our lives," said one of the neighbors, who typified the responses. Everyone wanted to tell their story and where they were when the tornado hit. It had been early afternoon, after church had let out. Many were eating out or had gone to family for lunch or to watch a ball game. Most didn't even know their home was destroyed till they drove back after the storm passed.

"Can we see the trailer parks that got so damaged?" I asked after we'd gotten the worst of the trash.

John drove a few blocks then turned into what used to be a park. I was immediately struck by the utter devastation and the stench of rotting food and endless trash. It was nothing like the partly damaged homes where we'd just been. The wind had blown several trailers away completely, leaving a trail of furniture and debris from their starting point. It looked like giants had twirled large sacks full of housewares and just let go. Everything was broken and strewn about; little looked salvageable. Residents whose homes weren't totally destroyed were out picking up trash or trying to make repairs.

"No wonder JoAnn wants to move to a house," I gasped. "This would be terrifying to come back to."

"Lots of people have moved out over the years," John said. "Many parks have closed. Insurance rates have skyrocketed because of rising storm costs. Since you can't get a mortgage without insurance, most pay cash to buy mobile homes so they can avoid the insurance. I doubt either of these parks will be rebuilt. A developer will buy the land, knock down what's still standing, then build spec houses."

"What'll happen to the people who lived here?"

"Some will move to another park, and others will stay with family till they can save enough to get their own place. Very few had insurance like the Martin's; most lost everything in the storm. There'll be fundraisers in town and on-line to help them get back on their feet, but it'll be tough for a long time."

"My back is so sore, I don't think I can pick up any more right now. Can we do something else to help?" I asked.

"How about we swing by the center and load up on water, grilled cheese and apples. We can make it back here within the hour so at least they'll have something to eat."

"I'm doing okay. How about I help with repairs while you two get food?" Joe asked. "And Bev, bring back those extra clothes we brought—looks like someone could use them."

Maybe Joe isn't so unhealthy after all, I thought as we drove away.

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I'd never felt so tired and sore as when we finally got back to the center, long after sundown. Every muscle in my body complained. I didn't even want any dinner; I just wanted to lie down. Joe found us sleeping bags, and John showed us where we could shower. Joe scavenged bowls of stew left from dinner while I made a picnic blanket with our sleeping bags. But underneath the exhaustion, I had to admit feeling good about helping. I wasn't just an extra pair of arms and legs, but listening to the people seemed to make them feel like they weren't alone with their problems.

"Is this how you feel after completing a project you know will make a difference?" I asked Joe.

"Nothing as concrete as this. I've been to many disaster areas, and there's nothing like it; that feeling of helpfulness renews my priorities. Our projects are more abstract. They'll eventually make a difference, but it'll take a long time."

"Is this why you seldom call when you're at a disaster site, this emotional and physical exhaustion?"

"Partly. Often there's so much to do, or it's too late and you'd be asleep. Other times I was too spent, but there were plenty of times I just plain forgot. I'm only human."

"You can say that again," was the last thing I remembered saying before falling asleep.

I awoke the next morning feeling less sore and snuck away without waking Joe. Wanting to help with breakfast, I headed to the kitchen. A couple of John’s co-workers, Ramsey Carter and Patty Barton, were already there getting food ready.

“How did you end up here?” I asked Patty, chatting while we set out dishes.

“I was working for the water commission, but the job posting for the center sounded like something I’d be interested in. I was tired of mostly filling out forms and wanted a more hands-on position. I interviewed and must have impressed someone since they transferred me here pretty quick.

“Besides disasters, what else does the staff do?” I asked.

“There’s lots of planning and drills. We set up educational seminars, bring in people to do demos, and roll out community projects. Some of us handle local items like updating building codes or flood maps to keep pace with climate change projections. Others relay project information or ideas that come from our locals back to the department.”

By then, some of the survivors had stopped by to help finish preparing and serve food. It wasn’t fancy: oatmeal, scrambled eggs, hash browns, and toast. There was plenty of hot coffee and tea for adults and OJ or milk for the kids. I was starving and didn’t wait for Joe to wake up. When he finally did, he ate while I helped on the clean-up crew. When the Red Cross showed up, we both donated along with many staying at the center.

Ramsey stopped by as we were finishing our juice and offered to give us a tour.

“All the centers are what we call zero net energy, which means our center creates as much energy as it uses,” he told us while we walked. “It’s off the grid, so we don’t have to worry about power outages. We got training before construction started so we could monitor the work along the way, but most of it is common sense and paying attention to details.”

Stepping onto the front porch, he continued, “Heating and cooling is our biggest energy user, so you need to keep out most of the outside air and there are lots of places it can come in from. It starts with the exterior framing. Everything that has a crack or meets up with another frame gets sealed. Every sheathing sheet gets caulked around its perimeter. Every window, door, seam, hole, bolt, vent, wire, pipe, or tube coming from the outside gets adhesive, foam, caulk, or tape. Rubber seals where framing meets sheeting. They do similar things on the interior. Near the end, we played a little game to see who could find the most missed places after the crew had left at night, using everything from hands to flames, the loser bought beer."

On our way to the back, he pointed out shade trees near the house with a larger grove further out. "We use as many trees as possible for shade and to help pull carbon out of the atmosphere. Over there's the community gardens and compost pile; they're more than an acre total and organic only. We have rain barrels to capture water from the roof and inside tanks for water used in sinks and washers. For fertilizer, a local rancher donates some of his manure, which we augment with the center's compost." Ramsey turned to his right. "Over there are fruit trees: pears, apples, and peaches. They're so popular we have to limit to one bushel per household, and we still run out. We added more last year, but it'll be a couple more years to start producing."

"When we get our house, I want to plant some; just imagine walking outside to pick our own," I whispered to Joe.

Turning back toward the house, I noticed solar panels covering the roof. "Do those provide all your energy?"

"Yes, and they heat the water too. They're very efficient because they tilt with the sun, all part of the building's energy control system. We do have a backup generator just in case, but we've never had to use it.

"These doors are heavily insulated with extra latching so they seal tight against the weather-stripping," he mentioned as we reentered through the rear. "Heavy insulation is a big key to achieving net zero energy, as are high-efficiency windows. Ours have a low emissivity coating and electro-chromic glass for shade control. It's amazing how much it helps with the summer heat. Most open, and with the help of ceiling fans, we use natural ventilation whenever there's decent weather. Plus they really help with that cramped smell for times like now when we're so crowded."

Next Ramsey showed us the basement. "That's the geothermal heat pump for our heating and cooling; their loops go right through those holes bored in the floor. Next to it, the water heaters. The last thing on the tour is this long-term food storage room."

Opening the door, I saw stacks of cans, buckets, and pouches completely filling the space.

"There's enough to feed all of Screven County for a week," Ramsey explained. "Thankfully, we've never had to use them."

As we headed back to the main room, Ramsey summarized the center's objectives. "We're very proud of our energy methods and give regular tours to show the community how they can do it too. New construction is straight forward and saves tons of money over the long run, but retrofitting an older home with energy saving features can be daunting for a home owner. So we educate them as much as possible and calculate their energy savings to see how long to payback their investment. We also work with local businesses, always eager to save money as well as showcase their place as having low emissions."

"We better get ready or we'll miss the memorial service." I said, noting the time.

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The large Methodist church was a few miles away. Entering, we saw it was nearly full, but John had saved us space in a pew near the back. The minister spoke first, providing comforting words. He was followed by relatives, friends, and co-workers who came forward to share their memories and offer up prayers. Knowing a collection plate would be passed for funeral expenses and the surviving families, we'd stopped at an ATM on the way.

After the service, we lingered with the staff for a while longer, but soon it was time to head to Augusta and catch our return flight.

"It was fortunate the center's in such a good location, and the people who work there couldn't be better," I told Joe after take-off.

"Those aren't coincidences. Lots of planning goes into their location, construction, staffing, and operation. Georgia has lots of tornados and trailer parks, so centers are located near them, built to withstand the heaviest winds. John, Ramsey, and Patricia exemplify the kind of staff we strive for, highly respected local leaders who have a genuine interest in the community."

"That was common?" I couldn't believe it could be replicated on a large scale.

"Yes, and I've been to lots of them. Don't get me wrong, they do a great job here, but there's excellent staff at most centers. They're all designed as showcases for emissions reduction and carbon capture to encourage locals to replicate them. But their primary objective is the community’s health and safety. Disaster plans are thoroughly reviewed by our department with trial runs to continually refine them so when one strikes, they’re as ready for it as possible.”

“So they’ve saved lots of lives?”

“You’d be amazed. Disaster planning has been a foundation ever since Hurricane Katrina devastated the Gulf Coast and killed nearly two thousand people almost forty years ago. Before Katrina, few communities had sophisticated disaster planning, but afterwards, most developed and kept refining them as climate disasters mounted. By comparison, a dozen years later, Hurricane Harvey hit southern Texas every bit as hard as Katrina hit, but less than a hundred died. Still a lot, but so much better than Katrina.”

“I remember that hurricane, the record rainfall and the massive flooding it caused. My parents watched it on the weather channel for days. It was the first time they ever donated money to disaster victims—now they regularly do.”

“The planning helps save lives for most climate disasters, but sometimes they’re so extreme even the best planning seems powerless. Like the Kansas City tornados or the drought years of ’31-’32 when so many thousands died. Opening these centers was one of the department’s first projects, and since their start, the disaster death rate has been cut to half of what it was just a decade before. If people use them, they save lives. And people are using them because they work.

“And they do more than just plan and manage local disasters. They’re our eyes and ears to the local community for all our climate change projects,” he continued. “They gather climate information, organize bird and animal counts, and review ideas of the locals for energy savings and reducing emissions.”

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This is way more interesting than my tax work, I thought as we began our descent into D.C.

During the next few weeks, Joe was true to his word. There were no late nights, working on weekends, or traveling. He was attentive and even romantic. We began having real conversations again and our sex life went from virtually non-existent to near honeymoon frequency. He'd passed my initial trial phase, but I knew from past experience how quickly he could slip back to his old routine.

My job continued to bore me, so I kept asking about the centers. The more I learned, the more interested I became.

"Do you think we could go to another?" I asked Joe one night.

"You'd want to go again?"

"I felt more useful than at any time in my current job and want to see if it was a one-time thing."

The following Tuesday Joe called me at work to say there was flooding in the Colorado Rockies due to an early spring heat wave.

"I can get us on a flight tonight if you're still interested."

"I'm leaving now to pack," I said without hesitation.

The next few days were just as exhilarating as Georgia had been. There was more property loss from the heavy flash flooding, but the people remained resilient. The first day, Joe and I wore ourselves out helping build makeshift dams, using sandbags to protect important infrastructure. The following couple days we were just as exhausted from helping residents salvage belongings and clearing away soaked carpeting and furniture. The center's staff were as professional and helpful as Sylvania's, just as Joe said they'd be.

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Flying home on Saturday, I broached the subject I'd been hatching since returning from Georgia.

"What would you think about me coming to work at your department?"

"You'd consider working there? You hated me even talking about it and walked out because I brought work home."

"I know it's a big change of heart, but these trips right after our big fight affected me. I made a difference in a few people's lives and it felt great. The work has changed you; you're not the same person I married. I still am and have been resenting you for changing. Maybe it's time I matured too."

"We're in a hiring phase to staff up our new projects. With your analysis background, there are several positions you'd be qualified for. You couldn't work in my section since we're married, but there are plenty of others. If you’re really serious, update your resume, and we can go through the department openings to find your best fit.

Chapter 5

I was more than a little surprised when, the next night, Bev followed through on her idea of working at the department by updating her resume. Scanning through it reminded me of her technical background. She had gone to Pitt and got her undergrad in mathematics, and her masters on multivariate analysis techniques. She listed analysis coding as a strength, since for her dissertation, she'd created software to handle complex analyses. She'd been at the same firm for a dozen years since graduation. Initially she'd been at their headquarters in Pittsburg writing code for the company's corporate tax work, but when I took the position at the department, she transferred to their D.C. office, which focused on corporate audit preparation. We scanned the on-line departmental openings, and she found two that interested her and sent in her application information.

The following night after dinner, we headed out to find cold-weather attire for our ski weekend, making sure to get pain relievers, knowing how sore we'd be after a day on the slopes.

Saturday morning dawned clear but cold, so we bundled up with vinyl coats, bibs, gloves, and heavy socks with long johns underneath for the walk to the bus stop. Most of the season's snow had melted at home, but as we entered the Appalachians, it became heavier with plowed piles lining the road. The last several miles were a series of twisting roads with steep canyons that gave us a proper escape from city life and introduction to our adventure in the mountains. Arriving at the lodge, we followed signs to the equipment rental for our final preparations before venturing out to experience it.

"Let's go!" I shouted once I'd finished attaching boots to skis and pulling on my gloves.

"I want to start slow Joe, let's do the bunny hill till I feel more confident."

"I'm ready for the lift whenever you are," I said after a couple excruciatingly slow trips down the miniscule sloped bunny hill.

"Me too, I want some excitement."

"Kiss me," Bev told me on our first lift ride up the mountain side, canyons beckoning below. "Don't get carried away now, it's a long way down," she said with fogged up goggles from our efforts.

It only took two trips down to get my ski memory back and feel confident with turns and stopping.

"Ready for a longer run?" I asked after Bev finished her second run.

"Sure."

We stopped at the top of the longer lift, took off our goggles, and admired the sun reflecting off the snow as we scanned for the best way to descend.

"Follow me," I shouted after readjusting my gear and starting down.

"That was exhilarating," Bev said at the bottom. "But I nearly wiped out a couple times, trying to keep up with you. Your potbelly must really help your speed, I used to be able to stay with you. I'm leading the next run with a head start; it's your turn to catch me."

We made several runs before cold, hunger, and soreness caught up with us.

"Let's warm up and grab some lunch," Bev yelled and started for the lodge.

We laughed at ourselves during lunch, commenting on how awkward and out of shape the other was. But even after gobbling down pain relievers, hot chocolate, chili, and fries, we weren't anxious to get back out till our soreness waned.

"Let's check out the ski shop," I suggested.

We browsed the latest fashions before getting some sun screen and lip balm.

"Stop that." Bev laughed after I kissed her, taking most of her newly applied balm.

Then she did the same to me but lingered even longer than I had.

"We're going to need another tube if we keep this up."

"Let me help you with that sun screen; your face is all splotchy," she said, rubbing my cheeks as her legs rubbed against mine. Even through all our clothes, it sent a very pleasant message.

We finally felt ready for the slopes again. After a few more intermediate runs under our belt, we ventured to even more challenging trails, higher in the mountains. The spectacular views and warmth from the bright sun had me feeling extra cocky. About halfway down, I went over a mogul too fast and was on the ground before I knew what happened. After brushing the snow off my face, I noticed blood on my glove.

“You’ve got a nasty-looking cut on your cheek,” Bev said after a quick examination.

We went to the medical tent, but luckily I didn’t need stitches, just some gauze and a lowering of testosterone. When we went back out, Bev insisted we return to the intermediate runs for my own good, and I managed to stay on both feet the remainder of the day. The sun was low in the sky when we decided to head in. We ate a hearty meal in the lodge then caught the shuttle to the B&B.

The Black Diamond was a three-story, Queen Ann style Victorian with a welcoming gabled front porch. The hosts, Barb and Harry Tucker, gave us the nickel tour on the way to our room, pointing out the nineteenth century furniture, dishes, paintings, wall paper, and knickknacks along the way. The first floor had a large sitting room, dining room, and kitchen. In the hallway, coffee, tea, and a selection of British sweets were available anytime. The upper two floors had seven bedrooms, each individually decorated with a different motif. Unlocking our room, Harry reminded us breakfast was at nine.

We surveyed the room décor, noticing the coordinated wall-paper and bedding. The heavy wood furniture and abundant throw pillows provided a warm colorful touch. The bathroom was surprisingly large with an inviting soaker tub and all manner of soaps and lotions.

“Let’s go down for tea and dessert,” I said, my hunger already returning.

“I thought you were watching your sweet tooth.”

“I worked hard enough on the slopes for something extra, but if not now, I certainly will tonight.”

“My, aren’t we sure of ourselves,” she replied in a mock British accent, reaching for my hand.

We brought our snacks and tea back to the room, and I suggested we have them in the spacious tub.

After a few bites and sips of tea, Bev invitingly whispered, “wash my back” as she rolled over with her elbows on the tub’s edge.

“My pleasure,” I said and worked up a large lather in no time.

Soon I was exploring other areas while she arched and spread her legs. Then she rolled over, and I attended to her front.

“Now it’s my turn,” Bev cooed, taking the soap from my hands. I let my body float to give her complete access.

“Let’s rinse off and climb into bed,” I softly whispered when we were both breathing hard. After quickly toweling off, we slid under the covers, kissing passionately as I entered her.

“Hush, the other guests will hear us,” Bev whispered when I moaned too loudly, but soon she was making passionate noises of her own.

When we finished, I moved just enough to shift my weight off her and we both fell asleep still damp from the bath and our playtime.

The next morning I could tell it was already daylight before I even opened my eyes. I squinted at the clock and saw we were already a half hour late for breakfast. I gently nudged Bev, but when she mumbled, “Just a few more minutes,” I knew we’d be eating somewhere else.

It was after ten till we finally made it down, apologized for missing the home cooking, then headed into town to find a late breakfast and schedule an Uber to the lodge.

“Do you want to hit the slopes as soon as we get there?” I asked during the ride, my cheek still sore from yesterday’s fall.

“I feel so warm inside; it’s going to be hard getting back out in the cold. Let’s get some hot chocolate first, then equipment.”

We eventually made some runs, but neither of us felt the same rush as yesterday. We came in for a late lunch, returned our equipment, and gradually made our way home, agreeing it was our best vacation in a long time.

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Wednesday was Bev’s two interviews and she was nervous while dressing.

“How does this look?” she asked, coming out in dark-blue slacks, white blouse and a sweater, her third outfit of the morning.

“Feminine but still business-like,” I said, remembering some of the things she’d taught me to say over the years.

Catching me, she said, “You’re just saying that so I won’t change again.”

Finally ready, we boarded the train together, a nice change of pace since we normally went by different routes. Walking with her to the first interview, I gave Bev a quick peck, wishing her luck. I knew I wouldn’t see her till the end of the day since her second interview was right after lunch.

I spent the day researching the desert project. The best source for up-to-date climate science was the Intergovernmental Panel on Climate Change (IPCC) web site with a searchable database for any project related to climate change, including an abstract with contact information. To my surprise, when I searched under the keywords “desert afforestation”, I got a hit. According to the abstract, India was doing a project in the Thar Desert, using nearby desalinated lake water. I sent an email request to its author, Aarav Kholi, for more information and began reading.

Late in the afternoon, Bev texted that she was back in the lobby. I saved the notes I’d been making then took the stairs to avoid the long wait for an elevator. On our journey home, she filled me in on her interviews.

“The analysis work here is amazing. I’ve been doing tax stuff for so long, I’d forgotten all the other things it’s used for. First, I met with Wanda Robinson, the Agriculture group’s supervisor along with the lead analyst, Roger McIntire. They described some of their work with the Department of Agriculture. The DoA uses the analysis from Wanda’s group to help set policy and make recommendations to farmers and businesses involved in every aspect of the food process. They’ve got several projects going on right now, along with their standard monthly reports, and they’re short-staffed. I could tell they really wanted me and made me feel extra welcome.

“Next I met with the climate group, who seemed to do even more since their work is used by nearly every department here. Their department is much larger, but they also said they desperately needed more people.”

“I work with the climate group a lot; they do top notch work. But the ag group also has an excellent reputation. Did you interview with Walt Robinski?”

“Yes, he was nice enough, but a true nerd, unlike you who just pretends.”

“Yep, you nailed him.”

“They both offered me positions, and I’m struggling to decide. I’m sure the work would stimulate me at either one, so I’m looking at other aspects. Everyone was friendly and pleasant, so that doesn’t work. Frankly, the biggest difference is the group size. The climate group is so big; maybe I’d get lost in the humanity. The smallness of the ag group feels cozier. Is that a valid enough reason to make a decision?”

“I think you’d be happy at either, so if the smaller atmosphere is more to your liking, go for it.”

“Okay, I’ll give notice at my office then call Wanda and accept her offer. She mentioned some terms I’m not familiar with, ‘adaptation and mitigation’. I was too embarrassed to ask—she probably assumed I knew them being married to you.”

“Mitigation is reducing greenhouse emissions or removing them from the atmosphere, like having a solar panel roof or planting trees. Adaptation is trying to deal with the effects of climate change, like all the disaster planning at the centers,” I explained. “So, have I caught up with Walt for nerd of the year yet?”

“No, and I don’t want you to either. On the tour, Wanda showed me the gym, and I’d like to start working out there after work. That way we could ride together since you work later. If you need some extra time in the mornings, you could get up early and work while I’m getting ready.

“Deal. I’ll even make coffee while you’re in the shower.”

“Okay, but join me sometimes, you still need practice washing my back.”

I spent my now-free evenings doing things with Bev, feeling like we were dating again. We went to shows, movies, a return visit skiing, and a weekend in the Bahamas. We started a routine of cooking together. I’d always enjoyed it but seldom took the time. One of us would make the salad and peel potatoes while the other prepared the entrée. Grocery shopping became more enjoyable as we tried out new recipes and ingredients. We also began the house-hunting process. Since we’d looked around the old Metro stops previously, we decided to focus instead on the newly added stops which were getting a lot of new construction. Rather than look at specific places, we made dates for each stop to see what we thought of the area. Once we picked an area we liked, we'd start looking at specific houses.

At work, I was meeting with my staff regularly on our new projects; the first order of business being to select the order of their detailed science phase. Since the president wanted to begin announcing projects soon, we selected the simplest and easiest to accomplish as the initial one, expansion of our earlier tree planting program. For the remainder, we created an algorithm to input each program's details and calculate carbon capture levels based on the order in which they were done. Even though we were still below target, this would at least determine the order that would get us the closest. Using this algorithm, we found that air capture, removing carbon directly from the atmosphere, calculated to be second. We began weekly report outs on both while I continually looked for ways to increase their levels, trying desperately to meet our goal.

The last week of the month, Jennifer's staff, including me, were scheduled to attend the annual report outs by IPCC member countries. These were the result of the emergency conferences held last year when the new targets had been developed. They were being held at rotating locations with this year's in New York City, which had the facilities available to host the event on such short notice. In addition to hearing everyone's progress, I hoped to find out more about India's desert project. Remembering my promise, I asked Bev to come along.

"I'd love to see New York, but I'll be training my replacement, so I'll have to take a rain check. Just don't forget the nightly phone call."

"How about nine o'clock? That way I can set my phone alarm."

"OK, but I'll have my bag packed for Rita's if I don't hear from you by 9:01." She deadpanned, so I couldn't tell how serious she was.

At lunch on the first day of report outs, I introduced myself to Vihaan Rao, the leader of the India delegation, and told him of my interest in their project. He had some knowledge about it, so we arranged to meet that night to discuss it further.

"The Thar desert is in the northwestern part of our country," he began. "It was selected for its climate, vegetation, access to irrigation water, and relatively low indigenous population. The project's original purpose was to produce biofuel, but it's been expanded to include carbon capture after last year's meetings. It began about five years ago with a complete analysis of the area's environment so we could determine what changes were needed to grow a specific variety of Jatropha tree, where the oil for the biofuel comes from.

"We spent three years preparing the soil for planting, digging irrigation ditches, setting up a desalination plant, and conducting seed hybridization studies for optimum oil production. We were rewarded when our first harvest produced good results. Our original plan was to use only a relatively small part of the desert, about three million acres, but with our new targets, we're now planning to increase it, taking advantage of the Jatropha's affinity for carbon capture," he explained.

"We're looking to do something similar, but one of our concerns is the harm to the desert environment from so much planting and irrigation. I was hoping for any details you may have on that aspect."

"I've not seen those, but I'll contact Aarav to see what the environmental effects were."

I checked the time, saw it was getting near nine, and quickly thanked Vihaan for his time. Rushing to my room, I punched Bev's number in just as my alarm sounded. Her voice was a soothing end to the long day, and afterward, I slept soundly.

On Tuesday, our contingent listened as Mexico reported its status. They impressed us all by announcing they'd completed the switch to full renewable energy last year, primarily using recent advancements in tidal and wave energy technologies. Their net emissions were down to a quarter GT. Like most countries, they didn't report out to the new targets since they hadn't finalized their carbon capture projects, but they reiterated their full commitment to meeting them.

After their report out, Susan Wainright and I discussed their accomplishment. Both wanting to understand more of its details, we arranged to meet with their technical staff over dinner the following evening.

On Wednesday, Jennifer reported our status by showing plans to complete the transition to renewables later this year and our two GT net emissions. That evening at dinner, we met with Antonio Garcia and Ronaldo Vasquez, two of Mexico’s hydropower experts.

“Since we have so much coastline, ocean hydropower was a natural for our renewable energy,” Antonio explained. “We studied all the wave and tidal designs available but found them either too expensive or unreliable. So we selected the best, did our own development, and once they met our criteria, began mass production.”

“Which systems do you use?” I asked, knowing there were several of each type.

“For wave energy, we primarily use buoy and membrane systems,” Antonio answered. “The buoy type harnesses the wave’s motion to drive a turbine while the membrane utilizes its pressure differential. The location and wave energy of the area determines the type and we fine tune it to their specifics. I personally favor the membrane system. It has more flexibility and is usually the most efficient. It took a while to develop proper materials that would hold up to the sea environment, but once we did, they work amazingly well.”

“My specialty is tidal design,” Ronaldo added. “Just like for wave energy, we have multiple designs that we use, depending on the location and tidal forces. My favorite is the stream generator type, which uses the tide’s current forces to drive a submerged turbine. They are quite versatile and can be placed just about anywhere where the tides are strong enough. We also have several tidal lagoons which are more efficient but require more structural work and up-front cost. For those, we dam up a large area then place turbines at the inlet to capture the tide’s forces as it goes in and out.”

“We have a few of each in use, but we didn’t find them economical enough to do many,” I replied. “We mostly use them to aid in coastal defense. In combination with seawalls and vegetation, they minimize a storm’s effect while generating power to boot. Years ago I toured a lagoon in the U.K. and was struck by its ingenuity and capability, I’d love to visit one of your sites to see what innovations you’ve made since.”

“We’d be happy to have you,” Antonio replied, handing me his card.

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On Thursday I met with Vihaan on the Thar Desert environmental results.

“Aarav reported that the three million acres of already-planted Jatropha had significantly affected the adjacent desert land. The trees and irrigation water produced temperature reductions and higher humidity over large areas. Vegetation not normally found there began growing, pushing out many of the indigenous species.

“Our modeling shows much the same thing,” I commented. “I was hoping it was somehow mistaken, but this seems to confirm the models.”

“Since we’re planning to expand the project, we’re working to improve it. Aarav’s team created analytical models from the initial planting which show the best solution is to reduce irrigation. To keep high carbon capture levels, further hybridization is being done to find a variety of tree that produces under more arid conditions, using increased fertilization to compensate. Test plots have been planted, but it’ll be several months for initial results.”

I left feeling dejected. I’d been holding out hope that our modeling had been too conservative and overestimated the size of the problem, but this was confirmation, and I couldn’t help but wonder if it were even possible to increase our densification enough to hit our commitment. I called Bev when I got back to my room, but even she couldn’t cheer me up.

After the meetings ended early the next afternoon, I headed for home, anxious to see Bev and get my mind off the desert results.

“While you were gone, I did some house research,” she began after we’d kissed and sat down to dinner. “I made this list of ones for sale on the northwest side since we like the feel of that area. It has the house style, square footage, type of amenities, lot size, and asking price.”

“Since we’ve already decided on the budget and minimum number of bedrooms,” I said grabbing a pen, “let’s check off the ones that don’t fit our criteria and see if any are open this weekend.”

After dinner, we discovered one of them was open on Sunday. We studied the listing information and pictures then pulled it up on Google Earth for a bird’s eye view of the lot and neighborhood setting.

“I like some of the things about it, but not the bedroom setup,” Bev commented.

"Me neither, but let's check it out anyway."

On Sunday after lunch, we hopped on the train and found the subdivision after a short walk from the station.

"I like the neighborhood," Bev said. "It's quiet; the yards are well-kept; and it has new sidewalks."

Ascending the wooden stairs, we surveyed the front porch, noting it was large enough for a swing, but it could use a fresh coat of paint. Barry, the realtor, greeted us as we entered, handing us the same spec sheet we'd seen on-line. We were in the great room, which was plenty large for our needs and nicely laid out.

"The owners just replaced this carpeting," he pointed out. "Just wander around, and I'll be happy to answer any questions when you're finished."

The large kitchen, separated by a long island, had upgraded, high-efficiency appliances, plenty of counter and cabinet space, and a spacious nearby pantry.

"I really like the separate dining room." Bev said, "I'm tired of seeing dirty pots and pans on the counter while we eat."

While Bev was exploring the dining room, I checked out the adjacent den. *Perfect*, I thought. Plenty of room for a big desk, comfortable chair, and it even had built-in bookshelves. This was going down as one of my must-haves.

The master was next, just down the hall from the kitchen. It had all the essentials on our list, plenty of room for a couple of reading chairs, a walk-in closet big enough for both of our clothes, dual shower heads, and a large soaker tub. We retraced our steps; then took the opposite hallway off the great room to the other two bedrooms. This is what neither of us liked about the floor plan. When we got around to having kids, we didn't want them this far away.

Energy features were another of my musts, and this house didn't have enough. Some of the appliances were the latest high efficiency, but not all. Worst of all, it used gas heat, bringing to mind a colleague's description of gas's so-called benefits. "It's like saying that dying from a knife wound is better than by gunshot since bleeding out takes longer." But I knew with methane leaks from fracking and other sources, it really produced harmful emissions comparable to coal.

At least it had LED lighting and a programmable control system. Walking around the yard, I pointed out some more of the features to Bev: rain collectors in the gutters, several shade trees, and a light-colored metallic roof.

“What’s a cool roof?” Bev asked when I referred to it by its energy-feature name.

“It reflects the sun’s rays rather than absorb them like traditional asphalt shingles. This keeps the house cooler, requiring less energy for cooling. There are several types on the market besides metallic: tiles, membranes, and foam along with various coatings.”

“Do they cost much more?”

“It varies, this type of metallic roof is one of the priciest, but it will last a long time, saving energy every month. Most pay for themselves after a few years.”

While this wasn’t our dream house, we left with a better understanding of what we both wanted for one.

Chapter 6

The next morning, I got ready for work to the rich aromas of Joe making coffee and breakfast sandwiches. It was my orientation day where Joe said they gave everyone a working knowledge about climate change. While eating, we chatted about yesterday's house visit then refilled to-go cups and headed out the door, our first day on the job together. It was a bright sunny morning, the start of spring, and hopefully, a good sign for my new job.

Arriving, I scanned the nearly full auditorium, looking for an empty seat. *There must be nearly a hundred people here,* I thought, and finally I noticed an empty seat near the back with a thirtyish woman in the adjacent one.

"Is this seat open?"

"Sure is; my name's Shirley."

"Thanks, I'm Bev. It's nice having someone to sit by. I'm a little nervous about starting a new job—I'd been at my old one for years."

"It's my first full-time, one and I'm really looking forward to it. I'll be in the international group and living overseas."

"Don't you have a boyfriend who you'll miss when you're gone?"

"Not one I'm serious with. I'm secretly hoping to find that someone special in my travels. I think having a romance in another country would be so exciting."

We watched as the first speaker, a neatly dressed Indian gentleman, stepped to the podium and introduced himself.

"I'm Nayan Singh, your host for today. I'll be reviewing basic departmental information. I'll be followed by Veronica Torres from our environmental science group, then Charlie Peters, our department secretary.

"The first item is the basic organization" He began and showed the org chart on the overhead screen.

"Oh my god," I nearly said out loud as I stared at the list while sliding lower in my seat. Joe's name was on it, my Joe! There were only a handful of names, and his was one of them. Why didn't he tell me he was so high in the department? Or maybe he had, and it was one of the many things I tuned out.

I already knew Charlie; he had hired Joe and he was first boss. Looking at the other names, I recalled Joe mentioning them all at one time or another.

"At this complex, we have people from over a hundred countries," Nayan continued. "This is part of a scientific exchange program where we have people working in other countries. The knowledge sharing is priceless. Respecting the global aspects of the work is built into our HR rules. Discrimination of any kind is prohibited and grounds for dismissal, zero tolerance. This has rarely been a problem; in fact, we find the vast majority of our employees enjoy the multi-cultured aspects available here and treat others as they want to be. Many friendships have been made and correspondences kept up even after a visitor returns to their home country.

"Work security is another important item here. Since private companies are used for most of the project work, they often look for inside information to give them a leg up on the competition. For this reason, there's a ban on discussing any aspect of your work with them or the media, including social media.

"Since we have such a large, diverse group working on many intriguing projects, we've made provisions for personal group meetings to share that information to as many as possible. They're all open to every employee and meet at a variety of times and locations to accommodate everyone's schedule. These can be on virtually any subject, work-related or not. Some examples of non-work groups are child care, book clubs, commuting options, and local housing availability. Work-related topics include autonomous vehicles, wildlife habitat preservation, and coastal wetlands for flood protection. Specifics are on the department website, and I encourage you to check them out."

When I heard him mention the housing group, I made a mental note to attend a meeting; it might help with our house hunting.

His next topic I was already familiar with. "New employees should visit a locality where a disaster has recently struck to provide support and see first-hand the effects of climate change. There are centers in every town equipped to help people in emergency situations. They'll be happy to have your helping hands and comforting words."

Then he mentioned an audible alarm that sounded whenever there was a large climate-caused disaster somewhere in the country, either with many deaths or heavy monetary losses. "Its purpose is to keep the reason for our department's existence uppermost in everyone's thoughts and realize the sense of urgency needed for our work. The disaster details will be on our website." I couldn't recall Joe ever mentioning an alarm.

"Next, I'll hand you over to Veronica Torres from our environmental group."

Veronica was dark complected with a medium build and looked to be in her forties. She spoke with a slight Latino accent, but an engaging, warm smile was her defining feature. It was highlighted by a subtle shade of brownish-red lipstick, complementing her facial coloring. She began by reviewing the basic science of climate change.

"Our Earth is able to sustain life as we know it because of our atmosphere. One of the most important things the atmosphere does is help regulate the Earth's temperature. It mostly consists of nitrogen, oxygen, small amounts of argon, and very small amounts of gases that react and store the sun's radiation and are thus called greenhouse gases, or GHGs. These are mostly carbon dioxide, CO_2, with smaller amounts of nitrous oxide and methane along with a few stable elements. These are the means our atmosphere uses for regulating global temperature.

"Much of the sun's incoming radiation passes through our atmosphere to heat up the Earth's surface. The heat returns to the atmosphere as radiation in longer waves. Most passes back into space, but some is retained by reacting with these GHGs. Too little of these, and the Earth would be much colder, too much and it becomes too hot. Their historical levels have worked well for humans to not only survive but to thrive and have allowed our species to become what we are today.

"So what are those levels? We break them down to before and after the industrial revolution. Before it, in the mid-nineteenth century, GHG levels were reliably cyclic, going from ice age to ice age. At the end of the last one, about 15,000 years ago, the CO_2 level was about 180 parts per million, ppm. It rose relatively quickly to about 260 then stayed nearly constant for more than 10,000 years. This pattern has repeated many times over the last 800,000 years. The highest level ever measured was almost 300 and the lowest, 180."

A woman in front asked, "How do you measure levels from that long ago?"

"We drill out ice cores in the Antarctic, which still contain trapped air bubbles. The deeper we drill, the older the air. We directly measure the gas levels of that air."

"But since the industrial revolution, that historic pattern isn't repeating," she continued. "Levels have been steadily rising instead of staying constant like we've seen over and over again. This was actually predicted by scientists soon after the industrial revolution began. They realized, by releasing large amounts of carbon into the atmosphere, it would combine with the free oxygen molecules already there and increase CO_2 levels.

"As you all know, the industrial revolution brought steep rises to industrial and agricultural production, new and widely used transportation forms, and mass production of heating, cooling, and energy. These were life-changing improvements to people's everyday existence, directly leading to accelerated global population growth. This growth led to more demand for those items, creating a circular relationship that continues to this day.

"Burning fossil fuels fueled this growth. Agricultural fertilizers helped grow food, and along with cattle, hogs, and other livestock, fed the increased population. But carbon and methane are emitted from the burning of fossil fuels; nitrogen comes from fertilizer runoff, and even more methane comes from cattle and landfill emissions. Some of these go into terrestrial locations like trees, vegetation, and soil; some into the oceans and seas, the rest into the atmosphere. When they combine with oxygen, they increase the GHG levels already there.

"Vast quantities, almost too large to imagine, have been emitted since the start of the industrial revolution. But deforestation and farmland cultivation have greatly reduced the Earth's ability to capture the carbon produced by these activities, so some of the carbon that used to be stored there instead gets emitted to the atmosphere. This is the cause of these historic GHG levels.

“Long-term climate change primarily driven by human activity is called anthropogenic. There are other causes of climate change, such as cyclic changes in the Earth’s orbit and our sun’s activity. These cause ice ages of varying degrees, the source of the cyclic GHG levels seen from ice core measurements. Climate scientists have measured the sun’s energy output and calculated the effect of cyclic changes on the climate since the industrial revolution and find very little effect due to these types of events.

“CO_2 levels are now about 450 ppm, a 50 percent increase from the highest pre-industrial revolution level. Methane has tripled and nitrous oxide has risen by a third. These gases are often combined and called equivalent carbon dioxide, eCO_2, to show their total effect on regulating the Earth’s temperature. All of these levels are much higher than at any time measured back almost a million years, long before the human species began. We’re in new climate territory, and so far it’s not been pretty, but it will continue to worsen until emissions are halted.”

Another person asked, “Since you’re able to measure GHG in ice core air, do we also know its temperature?”

“Yes, but it’s not as straight-forward since temperature can’t be measured directly anymore. Instead, we measure isotope ratios. If you remember back from high school chemistry, an isotope is an element with a different number of neutrons than protons in its nucleus, thus having a different atomic mass than its base. Those with more neutrons have higher mass, fewer neutrons, less. The ice has differing amounts of hydrogen and oxygen isotopes, depending on the temperature at the time. So with careful measurements, we can determine its original temperature. When you plot those temperatures alongside GHG levels from the same time period, they line up quite well. They’re both cyclic, with a similar amplitude and frequency. The higher GHG levels correlate to higher air temperature, which is what science tells us and what scientists from nearly 200 years ago warned about.

“The increased GHG levels have caused global temperatures to rise 1½ degrees. Vast amounts of glacial ice has melted and flowed into the oceans. Combined with thermal expansion effects, sea levels have risen more than a foot, accelerating every year. There’s more energy in the atmosphere from the higher GHG levels reacting with solar rays. There’s increased water vapor since warmer air holds more. Oceans have warmed and become more acidic due to the acidic nature of CO_2, severely affecting marine life and coral. There's higher climate variability around the world: some places drier with more frequent drought, others wetter with increased flooding. The change of seasons has been affected the world over. All of these combine to make climate disasters more likely to occur and with ever-increasing intensity.

"Climate disaster data has been tabulated for decades: type, location, cost, and direct deaths. These are tornados, floods, droughts, wildfires, winter storms, hail, wind, and early freezes. Until 2005, before significant climate effects were being felt, there were an average of four at a cost of nine billion dollars each. But from then to when the department formed in 2033, they'd risen to twenty-five per year at a cost of twenty billion dollars. So from '05 to '33, every year on average, taxpayers spent nearly $500 billion more than the typical year prior to 2005. Financially these disasters happen in every state, affecting every person in some way, either directly, or by higher taxes and insurance rates to pay for them.

"But even more importantly has been the loss of human life. Planning has made a huge difference in the death toll. When Hurricane Katrina hit the Gulf Coast, there were few disaster plans in place, and almost 2000 people died; countless others had their lives changed forever. Afterward, communities got busy and developed plans; evacuations, rescue, and rebuilding by federal, state, and local became the norm. Plus the Red Cross, countless charities, as well as church-affiliated groups providing life-saving aid relieve temporary suffering and collect donations for survivors to help get back on their feet.

"Seven years after Katrina, Hurricane Sandy, a similarly sized storm, hit the heavily populated New York and New Jersey shores, but its death toll was held to 159. Then a dozen years after Katrina, there were three historically powerful hurricanes within a month: Harvey in South Texas, Irma in the Caribbean and South Florida, followed by Maria in Puerto Rico with a combined direct death toll of 251.

"Maria's toll was sixty-five, but later studies on their indirect deaths showed it far exceeded that. House-to-house surveys and further official scrutiny put the number of deaths from the storm's aftermath into the thousands. People stranded without power in extreme conditions died from every conceivable cause. Cardio-vascular and respiratory deaths spiked as air-conditioning nearly vanished for months before power could be restored. Sepsis and dehydration cases rose drastically as food and water became contaminated. Diabetes became more difficult to treat as insulin could no longer be kept refrigerated, nor special diets maintained. Renal patients had difficulty getting to dialysis. Suicides and deaths from Alzheimer's patients spiked from earlier periods. This realization led to changes in tracking the actual death rate of disasters and led states such as California and New York to set up safety centers to better help those in need.

"Mega-disasters comparable to Maria and Katrina accelerated in the '20s. Early in the decade, several tornados hit downtown Kansas City causing 1,114 direct deaths. A few years later, Typhoon Walaka hit the Hawaiian Islands killing 1,386, and then hurricane Michael hit Florida's southeast coast, killing 1,051 more. But these were just a prelude to the series of disasters in the early '30s, which everyone knows as "the drought years."

"You're all old enough to remember them. Records for heat and drought were set over much of the country. Then after the drought finally ended, strong thunderstorms and countless tornados followed, as if the country was experiencing biblical plague. Wildfires broke out all over the west. Dense construction near wooded areas had put large numbers of people in harm's way, resulting in higher death rates and causing more damage than ever before. Several out-of-control fires got close enough to large populations to kill hundreds who couldn't get out in time. With other fires, shifting winds changed their directions and killed many more. A chemical warehouse got hot enough that its stores exploded, killing several living nearby. One school caught fire, killing twenty-eight children from smoke inhalation before they could be evacuated.

"But the drought's effects were just beginning. It started in late spring after most planting ended and lasted most of the growing season. Large stretches from the West, across the Great Plains, and much of the Midwest were affected. Irrigation helped at first, but it eventually had to be curtailed as water sources dwindled. On average, grain yields were down 50 percent. Grain stockpiles were nearly used up for food, livestock feed, and making ethanol. Then, after the crops couldn't use it, heavy rains in the fall mocked the country and flash flooding killed many, including the same parts still recovering from the drought.

"It came back again the following year, like a horror movie sequel. But now, there weren't large stockpiles to fall back on. Drought brought water shortages even quicker, so crop irrigation ended even faster and yields fell even lower. Ethanol production stopped, but that offered only short-term relief from grain shortages. Imports increased to compensate, but several other countries were also experiencing poor growing conditions and had shortages of their own. Food prices skyrocketed from the fierce global competition which ensued. Cattle and livestock didn't have enough grain, hay, or grasses to eat and were sold underweight, causing meat shortages as the drought continued. Churches, local charities, and all levels of government held food distribution programs with remaining stockpiles and personal donations, but they eventually ran out as the drought stretched into the late summer.

"Eventually, those who couldn't get to handouts or afford the pricey food died from malnutrition or dehydration. Unemployment surged, the stock market plunged, and the suicide rates spiked. The heat coupled with water shortages and terrible economic conditions, killed the most vulnerable who couldn't afford air conditioning or get to shelters to find relief. In total, nearly 50,000 people died from the non-stop hardships, with countless others left devastated all across the country.

"But as Maria taught us, it's not just the immediate disaster effects that are so deadly; there are longer-term consequences. Dramatic life style changes, temporary displacement, and dangers from rebuilding after a disaster can also be deadly. The extreme temperatures, poorer air quality, increased risks to food and water, and changes to infectious agents also lead to poorer health and premature death.

"Deaths caused from these effects are difficult to measure because the cause is assigned to the specific organ or function whose failure caused it, while the underlying cause of the failure often isn't recorded. So after Maria, statistical analyses were developed to correlate deaths to extreme weather in the area during or immediately preceding a death. Since historic weather data and causes of death are available for many past decades, we used this method to compare the mega-disaster decade to the 1980’s, before the effects of GHG buildup, to see their true impact.

“Extreme heat and cold kills people—always has—and continues to do so. Air conditioning, central heating, increased sheltering, and warnings have greatly reduced its occurrence, but the sick, disabled, infants, workers with outdoor occupations, mentally ill, and elderly are especially at risk.

“Air quality is affected due to an increase in ground-level ozone, particulate from fossil fuel and wildfire burning, and increased airborne allergens due to vegetation changes. Increased cardiovascular and respiratory issues are the result.

“Climate change has led to changes in the seasons. In most areas, spring starts sooner and winter later. This has led to the spread and increased life span of mosquitos, ticks, fleas, and other bacteria-carrying creatures. Lyme disease, Zika, West Nile, dengue, malaria, and other vector-borne diseases have increased.

“Disasters cause infrastructure damage, degrading water quality by enabling growth of viruses, bacteria, and algae. Water runoff introduces these pathogens to the public, causing health issues and death in extreme cases. Similarly, these pathogens also affect food quality. Since pests and parasites have increased due to climate changes, more chemicals and pesticides are used to control them. Their run-off further contaminates food and water sources.

“Disasters cause people stress. Concerns about their loved ones, being displaced from their homes, damage to property and home, loss of work, and changes in physical routine all contribute to higher stress levels, leading to high blood pressure, stroke, drug abuse, and suicide.

“Last is the short-term aftermath of disasters, like what was seen with Maria: loss of power, medication and medical care disruptions, temporary resettlement, fatal injuries from rebuilding, and the stress accompanying the situation.

“In total, over 100,000 more Americans died that decade than would have just a generation ago because of our changing climate. Add to this the 65,000 directly killed by disasters plus countless more who suffer from poorer health. Combined with the economic catastrophe, this was what people were facing when our department formed.

“The department formed because the second of the drought years came during a presidential election. Fear and determination brought people together for a common goal: safety and economic security for their families. To many, the drought was the event that began a war, much as Pearl Harbor did. They demanded someone competent lead them into battle to fight this invisible enemy destroying their families and way of life. When a politician would try to answer their call, citizens would rhetorically ask, ‘Why didn’t you listen to scientists who’ve been warning of this for decades?’ Followed by, ‘How much of your campaign contributions come from fossil fuel companies?’

“Eventually climate-competent people began coming forward to fill the political void: ones with experience and who’d been involved in combatting climate change. There were scientists, researchers, professors, engineers, and technical leaders involved in areas such as flood control, renewable energy, and electric vehicles. There were also environmental experts from water management, parks, fish & wildlife, forestry, and other resource management institutions. Across the country they ran for local, state, and federal offices. Once elected, they formed a large influential, bi-partisan climate coalition.

“California Governor Stewart McGregor won the presidency in a landslide. McGregor ran his campaign based heavily on the success of his climate change initiatives in California. Tom Hawkins, then governor of New York, was picked as his running mate as they closely followed California with innovations. He created the department soon after taking office, wanting to stress its importance, receive direct report outs, and have one agency directly responsible for climate change solutions. He combined it with departments whose responsibilities were directly affected by climate change such as FEMA and the EPA. Then he created a direct link with integrated analysis functions with other federal groups whose work was heavily influenced by it; the Departments of Energy, Transportation and Agriculture, CDC, Corps of Engineers, National Parks, and the Forest Service.”

Veronica continued the discussion, talking about the safety centers, explaining their disaster planning and execution, energy-saving methods, and educational seminars. She concluded with her own personal story about a California center saving her and her family by contacting them in the middle of the night just before a forest fire engulfed their home. I could feel her passion as she described its various functions, and I wanted to add my voice to hers, giving my own profound experiences with them. I could only imagine how much Joe could add; he'd been to so many and found them so therapeutic that he'd risked his marriage to keep going.

Someone to my left asked, "What about cost; aren't these projects expensive?"

"It surprises many, but most have actually saved money," Veronica answered. "The centers have more than paid for themselves with disaster cost savings of all kinds. Saving energy is almost always a money-saving strategy, usually with just a few years payback on a more efficient appliance, cool roof, or insulation increase. Renewable energy is capital intensive at the beginning, but it pays for itself over time, how long depending on the type. Increased employment from development, manufacturing, and installations has been enormous, creating many new opportunities in countless fields. While many of our new projects to capture carbon will cost money, we're working hard to offset these as much as possible."

"I'm going to conclude with one of the most important examples of our work," she continued. "For more than a century, our coastlines have been under attack by all manner of foes; developers, industry, seawalls, and upstream dams among the worst. Even without sea level rise, these caused high rates of coastal wetland and wildlife disappearance, erosion, and periodic flooding in areas that used to be protected by the natural landscape. Then as the seas rose, it got worse. Thankfully, this was realized by some areas, such as the Florida Everglades, who took action to reverse some of the damage already done, and prevent even worse outcomes. Others locations followed: like the San Francisco Bay, Staten Island, and the Louisiana Gulf Coast. All learned much about what it takes to successfully reclaim parts of the wetlands.

"Using these and other results, the department went national, and began working with all coastal communities to study what protection would work best for their specific circumstance. Once a plan was analyzed and approved, work began quickly. Since then, enormous strides have been made in slowing down erosion and protecting our coastlines from storm damage. It’s been one of the big reasons for the reduction of property and life loss.

“I’ve enjoyed speaking with you today, this concludes our morning session. After lunch, you’ll hear from our secretary, Charlie Peters.”

Chapter 7

As we broke for lunch, my head was reeling from so much information about emissions, death, and destruction. Large disaster events had always been covered in the news as they happened, but since they occurred so often, I'd become numb to them. Seeing them all at once and hearing the entire story was mind-blowing. I needed some time to think it through.

"Damn," I nearly said out loud. Could this explain why Joe had been so absent from our marriage? Maybe he wasn't ignoring me; it was his way of dealing with this monster every day. I wondered if they'd studied divorce rates after disasters too.

After we got our food, Shirley and I sat down next to two other women who introduced themselves as Anika and Ricki.

They couldn't have been more different in appearance if they'd tried. Anika was thirtyish with medium-length dark hair, deep penetrating eyes, and conservative clothing. Ricki barely looked eighteen with the lithe body and clothing style that turned most men's heads. Of course she had highlighted blonde hair with blue eyes, or at least contacts that made them appear blue. She instantly made me feel frumpy and ten years older.

After introductions and short bios, we began discussing the morning's information.

"I found it gut-wrenching," Anika began after taking a sip of her soda. "But there was too much information; I know I won't retain everything."

"My work and school schedules keep me too busy to follow the news, but my parents follow this stuff religiously. They're the type Veronica mentioned about creating the change," Shirley added.

"Mine too. Ours was the first house in the neighborhood with solar panels. But the topic depresses me, so they don't mention it when I'm around," Ricki said.

"I vividly remember the drought years," Shirley lamented. "I was in high school and with the water restrictions, had to share bath water with my siblings then haul it out to our vegetable garden for watering. Dad lost his job and couldn't find another. He was so depressed; he wouldn't get out of bed most days. When he did, he'd stand in line for a temp job, but he usually didn't get one. Mom got together with others in the neighborhood who shared what they could to feed and clothe their families. It was years till I got a new outfit, now shopping is my favorite pastime."

"The biggest surprise to me was the health issues," I added. "Big disasters are always covered, but I didn't realize so many health effects were tied to climate change. To think there are more deaths from them than actual disasters is crazy scary."

"I have asthma and often need an inhaler when I'm outside," Anika said, setting her glass on the table. "It's worse when it's hot but really bad when the weatherman says it's an ozone action day. Now I understand why."

"When Veronica mentioned spreading viruses, I thought of my brother who lives in North Dakota. He caught West Nile a couple of years ago, and it turned into meningitis. He eventually recovered, but it took months to get back to normal. What she said about calculating the true effects of climate change makes sense. I bet if he'd died, they'd have listed meningitis as the cause of death and not attributed it to the lengthening of seasons," Shirley added.

We continued in this vein, discussing items Veronica had brought up till the buzzer sounded, signaling to return to our seats. The banter hadn't helped my mood—if anything, it had made it worse. Hopefully, Charlie would lighten it a little; he had a good sense of humor.

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He was already at the podium when we entered. As we made our way to our seats, I thought about all the times Joe had talked about him. As Joe's first boss and long-time mentor, he thought highly of him. He didn't get overly involved in the day-to-day but made sure he understood enough to satisfy himself that you'd done your homework. If he thought you were right about something, he'd back you.

Charlie had been white haired since I had first met him, but his facial lines showed his true age, now pushing seventy. He was quite tall, which helped to hide his pudgy build. His dark-blue suit, white shirt, and power red tie gave him that stereotypical executive look. When he spoke, his voice conveyed a unique mixture of self-confidence, charisma, and caring that I'd not heard before.

“I’d like to officially welcome you to the Department of Climate Change,” he began. “I trust you’ve found the morning informative and better understand the importance of what we do. The work here is challenging but rewarding. Our staff takes great pride in the accomplishments we’ve made so far, and with your help, we’ll make even more.

“I’m sure you’ve all heard of the Paris Climate Agreement signed twenty-five years ago. Its primary goal was to stabilize global temperature rise below two degrees from pre-industrial revolution times, but it strived for 1½. This was to be accomplished by reducing carbon emissions and increasing carbon sinks so net emissions became zero by mid-century. From there, we needed to pull out more carbon than we emitted to bring down the level, so if went slightly above two, we’d eventually return there.

“Two degrees Celsius, nearly four Fahrenheit, was chosen for several reasons. Many countries actually wanted it cooler to reduce its deadly effects, hence the verbiage for lower. But to meet a lower target required drastic actions, which would have overstrained many countries. Renewable energy was still in its infancy for many, and resources for producing it were limited. And frankly, the world’s politics got in the way. Not surprising, since it comprises almost 200 separate countries, each with their own agenda. Climate effects had become severe enough for every country’s leader to make a non-binding commitment, but not severe enough to embark on drastic mandatory changes. Because of the time lag between GHG increases and resulting temperature rise, the world was already most of the way to 1½ degrees at the signing, even if net emissions somehow could have been held near zero soon after. The world just wasn’t able to hold it any lower.

“Another reason for two degrees was because it was achievable with strong and steady progress, which leaders felt possible to manage over time. Knowing its harmful effects would continue to worsen, adaptation strategies could be developed and actions taken. But perhaps the most important factor was confidence that global temperatures could stabilize at that level, keeping the worst of its effects at bay.

“The initial emission pledges didn’t meet two degrees or even three, but it was a start. Compliance was voluntary, and there were periodic report outs by member countries to status their pledges and discuss innovations for use by other countries. This was hoped to be a springboard for member countries to increase their pledges and bring them in line with the target. Unfortunately, the U.S. got off to a rocky start as the administration which took office immediately after ratification decided to pull out for political reasons. Without our pledge, the temperature projection went even higher, to almost 3½. But when the next administration took office, the policy was reversed. An even lower emission pledge than our initial helped us quickly regain admittance and become one of the leaders of the agreement, which we still are today.

“Since the signing, we’ve made improvements in adapting to a changing climate and reducing emissions, but there’s still a long way to go. Climate disasters are still on the rise. Oceans are absorbing more carbon, heating up, and becoming more acidic, killing coral and marine life in turn. Forest fires regularly rage across western states from their hotter, drier climate. Flooding from storm surges, quick spring thaws, and heavy rainfalls destroy homes, crops, and businesses all over the country. Water and food quality suffer as sewers, not built to deal with the extreme waters, overflow. Constant drought creates food strain, and worldwide, starvation is at epidemic levels. Wildlife habitats are being destroyed, causing migration and extinction of countless species. Diseases are rising from vector-borne sources as seasonal changes affect their hosts’ migratory habits and life span. Deaths from exposure to extreme temperatures continue their steady rise.

“These will continue to worsen until we stop carbon emissions and remove some of what we’ve already put in. If we don’t, we’ll reach a tipping point where emissions will accelerate due to a mechanism called feedback. Feedback causes accelerated ice melting, regional heating, and already-stored terrestrial carbon to be released due to global temperature rise.

“These emissions are over and above those directly generated from fossil fuel burning and have several sources around the world. Perhaps the most well-known, the increased number of forest fires due to the climate getting hotter and drier in heavily wooded regions. The fires prematurely release stored carbon and soot particles from trees and forest vegetation directly into the atmosphere. The soot that falls on ice and snow darken it, causing it to absorb more solar radiation and accelerate the area’s warming.

“Melting of glacial ice is another. Ice reflects much of the solar radiation which hits it, but after it melts and exposes the soil below, most solar radiation becomes absorbed and heats the area much faster. This is one of the reasons why colder climates have seen higher temperature increases than warmer ones. Since the soil’s carbon was built up over many millennia, these areas have high carbon content. Similar to glacial ice, permafrost covers vast cold climate areas and protects the peat below from losing its carbon and methane stores. Plus, peat’s decomposition produces heat, causing the area to heat up even more. The amount stored globally is huge, several times what’s stored in all the Earth’s forests.

“Large quantities of mercury are also stored in permafrost. You recall that mercury is a heavy metal, harmful to humans and wildlife in large enough amounts. It’s fairly common in nature and released during volcanic eruptions, forest fires, and weathering of rocks. Over eons, it has built up in huge quantities in the frozen Arctic. But as permafrost melts, mercury gets into the water system, increasing its concentration as it drains into creeks, rivers and oceans. Some of the mercury will be consumed by marine life, and some will be absorbed into plants, which begin growing again in the melting permafrost. As microbes decompose them, their newly obtained mercury is released in even more toxic forms.

“Tropical rain forests are another feedback. Since they need heavy rainfall to sustain their vast vegetation, drier conditions cause its loss, releasing their stored carbon.

“A similar phenomena exists with coastal wetlands. They store tremendous amounts of carbon in their grasses and surrounding phytoplankton, but as wetlands die off they stop storing carbon. Instead they rot, emitting methane gas.

“The Arctic sea-floor has large stores of crystalline methane. As sea ice melts, some of the methane gets released, another feedback.

“The last one’s a bit different than the others but just as perilous. The melting of Antarctic glaciers whose bedrock is below sea level causes increased melting rates because its grounding line, the area between the ice and bedrock, retreats and allows warmer ocean water to penetrate, accelerating its melting.

"Accurately accounting for these feedbacks has proven the most difficult aspect of climate change science and been a major focus of the technical community for years. Countless measurements and calculations have now produced modeling that correlates well to measured feedback emissions, localized heating acceleration, and sea level rise. We now know how to take it into account, which is a huge step to ensure we don't reach the point where irreversible and humanity-threatening changes to our world occur. This is the reason you're here: we need your help.

"With the current emissions path, last year's projections showed global temperature rise reaching two degrees by the mid-2060s and nearly three by the turn of the century. Feedback emissions by the end of the century would exceed the amount of captured carbon, meaning net emissions would continue to grow and wouldn't reach zero. Feedbacks would accelerate as the Earth continues to warm, creating ever-worsening conditions.

"The increasing temperature means more ice melt, higher and more acidic sea levels, and more climate disasters. Marine life and the wildlife that consumes it will be more toxic, reducing the number of safe food sources for human consumption. Coastal cities will regularly flood and eventually become submerged. Conditions will worsen enough that the Earth won't be able to sustain its projected ten billion population. There also will not be enough water, crops, livestock, or marine food sources. Not enough safe living space without high risk of wildfire, flooding, or drought. No one can say with certainty when and how this will play out as each country seeks to provide for their citizen's food, safety, and habitation needs, but it's nearly certain to result in the largest destruction of human life in mankind's history since so many countries possess the ability to wipe out our entire species. America will likely be at the center of conflict due to our large levels of natural resources and military capability.

"To prevent this nightmare scenario from happening, global leaders came together again last year, now ready to take the necessary drastic actions that couldn't be taken at the original signing. We won't meet the original two-degree target, but a new agreement was reached that keeps feedback levels low enough to stabilize global temperatures about 2½. There's still time to meet it, but we need to act quickly and decisively.

Similar to the original agreement, each country made another pledge, but this time it's mandatory, with heavy fines and potentially harsh sanctions for falling short at various intervals along the way. The pledge is in two parts. The first is the same for every country: achieve zero net emissions by 2052. The second part, remove enough carbon to keep feedbacks from reaching unrestrained growth. Each country has its own removal rate based on factors such as area, population, GDP, and how well they met their original pledge. Ours is a ½ gigaton annually by 2057.

"A gigaton, or GT, is a short and simple word that may not sound like a big deal, but it's huge. A billion metric tons of carbon dioxide, more than two trillion pounds. To put this in perspective, it's equivalent to annual emissions from over two hundred million petroleum-powered vehicles. At our peak, U.S. emissions exceeded seven GTs, and we're still emitting two.

"We need every one of you to help us meet these ambitious goals. We must succeed and help other countries meet their pledges at the same time. Our emissions programs already begun will lower our rate to one GT—the best we can reasonably hope for. This means we'll need to remove 1½ GTs to meet our pledge.

"Our teams have identified several projects to achieve this rate. Details are still being worked out, but I'm confident with your help we'll meet our target. Some of you will be working directly on these projects; some will backfill so others can transfer, but all of you will play a critical role in the effort. I want to wish you all the best in our vital quest to make the world safer for future generations."

After Charlie left the stage, my three new lady friends and I promised to stay in touch and passed around contact information. It had been a sobering but eye-opening start to the next chapter of my life. I left the building with a heavy heart, still not recovered from the day's onslaught. *How does Joe deal with this every day and not be driven to drink or do drugs,* I asked myself on the walk back. I wanted to go right to a bar and try to forget what I'd just learned.

Chapter 8

The next morning I entered the front lobby of the federal building that housed my new work group. With its stately pillars and centuries of history, it felt cold and impersonal. Full of both dread and excitement, I felt like a young child on their first day at school. The guard greeted me without expression, asked for my name and ID, and then handed me an electronic ID card, curtly explaining its use for opening the doors. After a short wait, Wanda arrived and escorted me to her third-floor office, pointing out the various options for getting there.

"I imagine you're used to these old buildings with Joe working here," she remarked along the way.

"Not at all. To be honest, they're a little intimidating, especially after yesterday's orientation."

"Some love the character, but frankly, they're a bit too drafty for my tastes, I wear a sweater during the winter months."

On the way to her office, we passed row after row of four-person, shoulder-high cubicles. "We call those quads," she mentioned. "They give some privacy with their padded walls, but it's easy enough to talk to a co-worker on the other side."

When we arrived, she gave a more detailed background on my new assignment. "As I explained at your interview, we're broken into two main sections: standard reports and special projects. Standard reports are covered for now but eventually I'll rotate you there; it's a great way to learn about the ag world since we study so many of their features. But we're shorthanded on our special projects teams, especially the one studying the effects of carbon amendments to the soil. We're nearing the end of a multi-year study that started with a few fields and pastures in every state, but with every success, it's grown in magnitude. We've now got several large fields in almost every county, verifying the results of the smaller trials. It's a strong team led by Amy Anderson, who can answer any questions that come up. I'd recommend first reading through the earlier project reports; it'll be good background and get you up to date quickly. Afterward, someone in the group will give you specific training on the day-to-day activities."

Showing me to my work space, Wanda introduced my other new co-workers besides Amy: Cherise Taylor and Bart Dibble. Amy was fortyish, tall, and lanky with medium length brunette hair. She had a plain face without visible makeup and seemed shy, not saying much besides a soft hi and backing away after introductions. Hopefully, she was more approachable one-on-one; she didn't look at all comfortable in a group setting.

Cherise, on the other hand, had an infectious smile and outgoing personality right from the start. She was a petite black lady with long straight hair and looked to be in her mid-thirties. Seeing me eye the people in pictures on her desk, she introduced them, "That's my husband, Theo, and our two kids, Janelle and Langdon," handing me a group shot. "This picture's a few years old now; Janelle will be fourteen next month and Langdon's eleven. They're both into sports and love getting their pictures taken—that's why there's so many."

Bart must be fresh out of college, I thought; his young face didn't look ready for shaving yet. He was about Joe's height but with a heavier build and short black hair. We chatted for several minutes, getting to know one another then Amy offered to start me off with basic computer access tutorials, eventually showing me where the completed project reports were stored for my background reading.

At lunch, the four of us went to the basement cafeteria where we continued basic bios on each other. I told them right up front about Joe being a director, thinking it'd be better to find out from me rather than the grapevine and wonder why I hadn't mentioned it. Thankfully, no one gave it much notice. Amy opened up a little and even smiled a time or two, especially when talking about her dog and his zany quirks. I discovered Bart was in his first serious relationship and found myself giving him advice on how he should proceed.

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For the remainder of the week, I studied the reports and developed a true sense of the project. They documented a comprehensive series of trials covering all aspects of carbon augmentation for a wide range of crops. A type of charcoal high in carbon called biochar was added to the soil and had been studied under a range of conditions: varying amounts, different farming techniques, and variations in accompanying fertilizers. Graphs and charts documented its effect under varying weather and precipitation conditions, as well as in both irrigated and non-irrigated fields. The results had proven positive under most conditions, leading to this last large study.

Over the weekend, Joe told me that about needing to go to India for his desert project.

“I don’t suppose they’d give me time off so I could join you?” I laughed.

“I feel bad leaving so soon after you’ve started.”

“I’ll be fine; maybe I’ll invite Amy over for dinner while you’re gone and get to know her better.”

“There’s a big time difference, but if I call early in the morning, you’ll still be awake.”

“Just don’t forget. I’ve still got my bag handy.”

*****

On Tuesday morning, I noticed our social calendar showed a house visit for after work. After asking Joe about it, he remembered his poker buddy Barry gave him the tip, so he had set it up with the seller’s realtor, put it on our schedule, and promptly forgot to mention it.

It took almost an hour to get there by train and ride sharing, farther than we really wanted to consider. Approaching, I immediately noticed the large lot and freshly spread mulch, providing an earthy aroma. Most of the perennials were just coming up, but several early spring flowers were already in bloom, creating an inviting appeal. It made me wish I had more of a green thumb. But since I couldn’t even keep house plants alive, what chance would I have with a yard this size? Touring the house, we didn’t much care for the style. It was a two-story house but the cathedral ceiling of the great room seemed wasted space, and Joe commented on its wasted energy. It had our required three bedrooms, but they were all small, especially the two spare ones. The kitchen was its best feature, extra-large with the latest in appliances, cabinets, and counter-tops. But its size came at the expense of the dining room and den, which were smaller than what we wanted. As we left, we both agreed it had some nice touches, but we should keep looking.

We’d seen a quaint restaurant on the ride over and decided to walk to get to know the area better. It was still in the sixty’s, warmer than usual for early April, so my light green jacket was plenty warm as we noted the eclectic style of houses and state of landscaping along the way. Approaching the restaurant, the residential section quickly turned more business-like with shops lining both sides of the street.

During the short wait for a table, I noticed an aquarium filled with live lobsters and decided that one of those would be my entrée. Selecting one, I pointed it out to the hostess when she came to seat us. Joe decided on the day's special, potato-encrusted grouper, along with a bottle of Vouvray, which the waiter recommended would go well with our choices.

"Remember our first apartment hunt after you took the department job?" I reminisced about our previous home searches. "My parents hated the idea of me moving here; they'd heard so many negative things about it. So mom drove out to help me look while you were at work."

"It was more that she hated the idea of losing her baby since it was your first time living outside Pittsburgh. I don't think she's ever forgiven me for robbing the cradle and taking you so far away."

"I wasn't young when we married, you were just old," I chuckled as the waiter brought our entrees. "But after Rita moved out here too, she finally got used to it."

"We ended up in that gated community and both hated it. The floor plan was terrible, and everything kept failing. First it was the plumbing, then the AC."

"It wasn't all bad. I met Fran there. She was my companion and confidant while you were working all hours of the day."

"She was more heartbroken than your mom when we moved to our current apartment after our lease was up," Joe said between bites.

After dinner, we decided to have a drink at a piano bar the waiter had recommended. When we passed a little park with a romantically lit fountain, I squeezed Joe's hand and gave him a long kiss. I was feeling tipsy after the bottle of wine, but the fresh air and walk were helping.

The piano player was taking requests, so we each picked an old standby: one of Joe's jazz favorites and a slow dance for me. We sipped Mojitos and enjoyed the music. When our songs played, I laid my head on his shoulder, enjoying his feel and closeness while we danced.

On the walk back, we passed by the park where we'd kissed earlier. I was feeling tipsy again, so we found a bench to enjoy the serenity and prolong the evening. Soon we were kissing again, the setting working its magic. Feeling courageous from the alcohol, I glanced around. Not seeing anyone, I quickly stood up and stepped out of my slip and panties.

"What are you doing?" Joe gasped, looking around to see if anyone was nearby.

"Just giving you something to remember me by while you're in India." I quickly sat back down and told him to kiss me some more.

There was a grassy path between the bench and the woods where we eventually ended up. We lay side by side atop our jackets and were soon caressing each other. With the fountain lights in the background, we began making love. We tried not to attract attention, but the wine and romantic setting made us oblivious, so we didn't hear the couple enter the park.

"Are you alright?" a man's voice suddenly boomed.

We both called out, "We're fine," in unison then started rearranging ourselves. But before I could pull my skirt back on, I saw the couple peering at us over the bench.

"Oh," was all they said and quickly left us alone.

The moment over, we cleaned up as best we could and walked arm in arm to the train station. We found a nearly vacant car and held each other till we got home. Once there, we climbed into bed to finish what we'd started.

The next evening was my night out with the girls. It had been several weeks since our last one, so we'd decided on our favorite Thai restaurant to just catch up. Fran was already seated at a table with her favorite spicy drink. It had an unpronounceable Thai name, so she just called it a Kami. I ordered a Midori sour. Robin and her former college roommate, Maria, came in together just as my drink arrived. Maria was a paralegal and worked for a downtown probate law firm. She was originally from Costa Rica and came to nearby American University on a scholarship. They both ordered from memory: Robin, a Thai Sangria, and Maria, the house margarita on the rocks. For food, we ordered a bunch of appetizers and shared.

"Joe and I are having so much fun now that he's not bringing work home; it's like we're newlyweds again." I brought everyone up to date on our improved relationship. “The sex has been so great, we even tried it in the park, but we got caught. I’m so glad it wasn’t the police, who knows what would have happened?”

Robin stunned everyone with the news she was dating again. Her last relationship had ended so badly, she’d sworn off dating for good. It had lasted so long, we all thought it was permanent. Her new guy, Phil, was in sales, so we all warned her to watch out for his bs; he was a salesman and sure to have plenty.

“He’s the sweetest guy and just adores me. I’ve got him going to poetry readings, and he’s taken me bird watching. I’d about given up ever finding a guy who didn’t just want to talk about the three s’s: sex, sports, and stocks,” she beamed.

“My big news is that I got another dog,” Fran said smiling. “After Sam got run over, I thought I’d never get another. But I couldn’t resist and now I’m in love again. I named him Jimmy after the Superman character because he’s loyal and trustworthy. He loves walking in the park, and barking at the squirrels.”

“I hate to put a damper on our fun, but my sister Vanessa was recently diagnosed with ovarian cancer and had surgery last week,” Maria said, eyes looking down at the table. “She and her husband tried to get pregnant for months and went to her gynecologist when it had been nearly a year. They’re both devastated now that they can’t have children.”

“Do you think they’ll look into adoption?” Fran asked.

“I don’t think they’ve started thinking about options yet; they’re still in shock.”

Our stories and consoling went on for hours until Fran checked the time and said she needed to get home and walk Jimmy. We all hugged and made plans to meet for a shopping outing for our next get-together.

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At work, I had finished reading the back reports, and Amy was showing me how to retrieve data on the current soil augmentation trials and put it into proper formatting for analytical work.

“We’re entering planting season. By now most farmers have taken soil samples and sent them off for analysis,” she explained. “We get the results, do the analysis to calculate the specifics based on the crop being planted, irrigation, and weather trends, and then communicate back so the soil can be properly augmented.”

Because there were a myriad of analyses done with the data, it was important to enter and track everything properly. I found their process a bit cumbersome, but since analysis was my background, I caught on quickly. Amy and I had become regular lunch mates, and it was quickly developing into a real friendship. She’d begun opening up with me, talking on a variety of subjects, but curiously there had not been much on her background until one day at lunch I asked her, “I’ve heard so many stories about why other people came to work here; what’s yours?”

“It’s a long story; sure you want to hear it?”

“I’ve never heard a long story from you, so I can hardly wait.”

“When I was a toddler, both my parents were killed during Hurricane Katrina. They owned a restaurant in New Orleans and were both there when it hit, trying to make sure looters didn’t steal their equipment. They were both killed when the roof collapsed. My older brother and I were with a sitter and went to live with mom’s parents in Colorado for a few years until grandpa passed away. Grandma wasn’t healthy enough to care for us by herself, so we ended up in foster care.

“We had several different foster parents. Sometimes my brother and I would be with the same family, but not always. When we weren’t, he’d check on me as much as he could. When he turned eighteen, he started training to become a fireman, his dream job. His specialty was forest fires, and they sent him everywhere. He was killed about ten years ago, battling a fire in Montana during the drought years. I was living with him then, getting a degree in environmental science, and I was devastated. First, my parents were killed by Katrina and now my brother by forest fire.

“My studies were showing me climate change was a big factor in those kinds of disasters, so I started blaming everyone: government for turning a deaf ear and energy companies for saying it wasn’t an issue and they were using “clean” coal or natural gas. But I especially blamed the public for their apathy and not demanding our leaders take stronger action. My blame turned to anger, then to hate. I ended up having a nervous breakdown and began therapy to help deal with it. To get off meds, my therapist and I worked out a plan to turn my anger into something positive, so I decided to use my degree to make an impact on the environment. I interviewed here and finally felt some contentment being around like-minded people, actually trying to do something about climate change. But after a few months, my anger started to return, especially after work hours. I'd heard about the work group meetings and checked to see which met after work to occupy my mind on something besides anger.

"I found a group for people with just my problem. They call it climate change anger management and it meets every day of the week, each one at a different site and time because of its popularity. They use a similar strategy as my therapist did: do something positive to help offset the anger and combat the negativity. The meetings begin like AA, people standing up to discuss why they have so much anger on climate change and what positive action they're taking to combat it. I've found many like me who took jobs here as part of their therapy. The meetings motivated me to look for a volunteer program, and I found a group which works with foster children. We take the kids on outings, tutor them, and teach them a skill like cooking, fixing a flat, growing a garden, that kind of thing. It's been just what I needed to finally get my anger under control."

"That's amazing," I said. "I'm not sure I'd be strong enough, I'd probably just take pills, zonk out, and try not to feel anything."

"I tried that for a while," Amy responded. "But I learned it didn't fix my problems, only delayed them until the pills wore off."

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Our conversation reminded me about the local housing group Nayan had mentioned during orientation. I'd forgotten about it since we'd been looking on our own, but it was sure to be more efficient than our hit-and-miss approach. I checked the website, found it met the following day at one, and added it to my calendar.

The next day, I heard my first disaster alarm. *Taps,* I said to myself after hearing the first few distinctive notes. *Not exactly subtle*. *I wonder why Nayan didn't mention that little detail?* I remembered he'd said the disaster information would be on the department website, so I went to the link. Dozens of tornados across central Indiana and Illinois. Sixteen deaths were known so far and dozens of homes destroyed. High winds had knocked out power to hundreds of thousands, and first responders were still searching for survivors.

Soon the other things we learned in orientation began coming back, and I felt the hopelessness I'd experienced in the morning session when so much death and destruction were discussed. I remembered some of the statistics, like how many had died during Katrina, but now it was even more personal knowing it had taken Amy's parents. Then there was the monster hurricane year, all the flooding, long power outages, and millions of evacuations. That was followed by the revelation about how many really died from hurricane Maria. Then my mind flooded with the reminder of the terrible drought years where death, hunger, and hardships were everywhere, and its extended dryness nearly defeated us. Lastly came the memories of forest fires, year after year with their scorched earth policy of taking out everything in their path, including Amy's brother.

"Amy," I said to myself. *Where was she?* She wasn't at her desk, so I went on a search, finding her sitting at the back of the break room, tears running down her face. I gave her a hug and held her hand, telling myself I should be ashamed to feel so bad when someone like Amy had so much more to grieve for. I wondered why the department did this; it was cruel to focus on disaster effects, knowing so many had suffered tragedy.

Still in a somber mood, I eventually went to the local housing group meeting, and listened as the group explained their methods.

"We breakdown the area by school district since so many people list that as their primary criteria. We cover the ones shown on this map and have gathered data over time on each school. We also review the basics; commuting options, libraries, day care, senior centers, medical facilities, shopping, crime rates, dining, and entertainment. You can find it all on our group's website. When you visit a home, take the site's form showing what things to look for, and report out the next time you come," one of the organizers explained.

When she pulled up the form, I saw it included many basic home and yard details, and realtor contact information. Plus it included surrounding neighborhood info such as parks, sidewalk condition, and walkable shops: the kinds of things which made an area into a neighborhood.

Next, members talked about their recent home visits. Since Joe and I favored the northwest, I paid particular attention to houses there. The first one we'd visited was discussed, and I was impressed by the speaker's thoroughness, even hearing some features and issues we'd overlooked. I decided to check out their website to see if there were more homes in that area and to visit them while Joe was in India. I could describe them during our video calls.

That night at dinner I told Joe about hearing the alarm and Amy's reaction to it. "Can you imagine her having to cope with that every time that awful thing sounds? And who knows how many more are like her? How can the department do that to them?"

"They don't do it to be cruel, but to keep the public's suffering at the forefront of everything we do. They know it's an emotional rollercoaster for many, but they feel it provides the sense of urgency that's needed to deal with it. At the start, it gave me a helpless feeling, which I dealt with by going to disaster sites. The department has taken numerous polls on employees' reactions to them, and it's amazing the different responses: some feel like it's a personal memorial to a loved one who's died in a disaster, some feel the sense of urgency the department is hoping for, while others feel sadness or helplessness. But something motivates the employees. Compared to other departments, we do enormous amounts of work for our staffing level. The department doesn't want to stop the alarm because they think it's a big part of the motivation."

"Well, so far it's had the opposite effect on me. I was so upset I couldn't concentrate the rest of the day."

"Since my lunch with Oscar, I've been using it as a reminder to check on his islands. I pull up the international page to see what's happened there lately."

"Have you heard from him since he's been back?"

"They got the funding and supplies from FEMA to rebuild the orphanage. They raised it higher this time, but it still only provides the basics: a place to eat, sleep, and get out of the elements. Everything else is outside. Last month they had another tropical storm and needed to rebuild the outdoor storage shelter and repair some of the stilts, but at least no one died."

"Have they placed more kids?"

"A few, but they're still getting them faster than they can place them. Last time he wrote, they were up to fifty."

"That's heartbreaking. You'd think something more could be done to help them."

******

Joe left for India Sunday morning and I had plans to visit an open house that afternoon. During the walk through, the house looked as if it had been stuck in the past. The realtor tried to gloss over it, but the drab grey walls, dingy carpeting, and the hundred-year-old floor plan spoke for themselves. I tried visualizing brighter colors, new floors, and our own furniture, but it still lacked many of the amenities we wanted. I noted the energy features and took some pictures to show Joe, but I didn't expect him to like it either.

At work the next morning there was another Taps. I immediately went to Amy and suggested we take a walk around the complex. Even though it was chilly with puddles and the smell of worms from last night's rain, it raised our outlooks, so we decided to make it a routine for future alarms.

"Did you finish the analysis on the Arkansas fields?" Amy asked.

"Friday, then sent the results out to the local DoA agents. It's going to take a bunch of biochar; where do they get it all?"

"There are factories that make it from wood scraps with a process called pyrolysis."

"Our test fields will use hundreds of tons—that's going to take lots of scraps."

"It's becoming a problem with this latest trial expansion; they often have to order it from multiple sites."

After returning, I again checked the website for disaster details. A late freeze after several warm weeks had heavily damaged fruit crops across several southeastern states. Estimated losses were in the tens of billions. *At least no causalities,* I thought to myself.

After work, I visited another house. As soon as I walked in, I knew it wasn't right for us. I could smell cat pee and see scratches on the woodwork from the previous owner's pet. I grew up with a cat and loved it dearly, but with our lifestyle, pets weren't an option. I hurried through, barely noting any of the house's other features.

I'd invited Fran over for dinner to keep me company while Joe was away, and I filled her in on our house hunting.

"Mind if I tag along on your next visit? I like looking and could help counter the positive things realtors say."

"I'd love it. You're right, two sets of eyes are always better. Plus we've got similar tastes."

Joe called later that night, and I reviewed my disappointing house visits with pictures. "Fran's coming with me to tomorrow's house. The spec sheets are more promising, so maybe I'll have better news tomorrow night."

Everything about the next house was charming, beginning with its setting: ranch style on a quarter acre lot in a well-established neighborhood, just a short walk to the Metro. Inside, it had a warm, welcoming feel and was large enough for our needs; three large bedrooms, two baths, a den for Joe and the separate dining room I wanted. The kitchen was plenty large enough to accommodate us cooking together. With Fran's help, I tried to picture how our current furniture would look in the rooms, and then we discussed decorating ideas and furniture we'd need for the additional ones.

I was sure the energy features would meet Joe's approval. There was a solar roof for both power and hot water. Plus it had an electric heat pump and LED lighting, all programmable on a smart control system. The clincher was a large storage battery that the realtor said would hold several days of power for later use and also tied to the control system. Joe was always going on about how much these batteries had come down in price and were one of the features that helped drive the popularity of solar-paneled roofs. About the only things it lacked were my fruit trees, but we could plant those after moving in. The price was more than we had budgeted, but when I factored in the super low utility costs, I knew it would work. I shot loads of pictures to show Joe that night.

"You're right; it has everything we wanted," he said after I described it while scrolling through the pictures. "Let's make them an offer right away so we don't lose it."

The next morning I called the realtor with our offer, slightly below asking. Since it had been on the market several months, she was optimistic and expected to hear back soon. Joe’s flight was due in the wee hours of the morning, so I went to bed early and met him with a warm embrace. When the realtor called the next day to say the homeowners had accepted our offer, we rushed over so I could show Joe. As expected, he was thrilled with the energy features. But to my surprise, he went from room to room giving his opinion on furniture and decorating ideas. We signed the acceptance paperwork, realizing it was just a matter of time till I finally got the house I’d been wanting for so long.

Chapter 9

I returned from my India trip more optimistic about the success of our desert project. Even though their trials to minimize harm to the surrounding habitat were still underway, seeing millions of acres of Jatropha plants already growing made the trip worthwhile. Comparing their soil preparation and irrigation details to our models gave me confidence I was on the right track. Their latest trials were ahead of schedule, and they were dedicating plenty of resources to keep it that way.

I wanted to update our models with my learnings, but instead, the details of buying a home consumed my time. First, there were the mortgage paperwork, inspections, and insurance tasks leading to closing. Then came the moving prep and deciding what to keep or get rid of. I just wanted to make a quick decision and get things back to some normality, but Bev seemed to enjoy the process and spent hours recalling every item's detail before reaching her decision. Our disagreement led to our first fight since our reconciliation, but it was mild and didn't last long. Her friends came to the rescue, and our relationship didn't suffer lasting damage.

At Bev's prompting, I began getting up early to check emails and read reports, but I kept falling further behind on our new projects every day with no hope in sight for further desert analysis. At my next poker night, I tried complaining to the guys, but they gave me a reality check.

"You don't even have kids, so you ain't seen nothing yet," Barry joked. "Plus, I recall you saying that you were finally ready to get a house after patching things up."

"It just came on so fast," I reluctantly agreed.

"You'll get through it, but be ready when the next thing happens, because it will," Jayden added.

We finally completed everything and moving day arrived. We'd hired movers since we neither had the time nor the desire to do it ourselves. They came on Saturday morning, loaded up boxes and furniture, and were out in a couple of hours. We did a final inspection then made our way to the train station, passing our favorite shops and restaurants, wondering if we'd find adequate replacements in our new neighborhood. The movers stopped for lunch along the way, so we arrived first and discussed where to have them unload so we could paint most efficiently. We wanted to give the rooms that newly painted feel as well as add our own personal touches.

“Let’s just have them put everything in the spare bedroom and live out of boxes till we get done; it’ll be extra incentive to finish quickly,” Bev said after talking through the options.

“Paint the kitchen first since it’ll take the longest with all that trim,” I offered.

“Then the master, so we can sleep in our bed instead of a mattress on the floor,” Bev added as we saw the moving van pulling up.

When they finished unloading, we talked through color schemes for each room, then did a detailed walk through, making a list of everything we’d need.

“We’re going to get to know the local hardware very well,” I said, looking at its length. “We have to stock up on everything since we seldom needed these kinds of supplies at the apartment.”

The next day we made our first trip, which turned into a three-hour excursion. We came back with four different paint colors with their associated supplies, caulking and weather stripping to redo the windows and doors, rain barrels to catch downspout water for the garden, and fencing for a compost pile. Plus, we got all the typical yard and gardening supplies: a mower, a wheel barrel, rakes, and shovels. We brought home enough to start painting and set up delivery for the rest.

“What kind would you like?” I asked Bev while looking at the selection of fruit trees at the local nursery the next day.

“I can’t decide; how many can we have?”

“How about we keep it to four? I want a pear so that leaves you with three selections.”

“Living near Washington, we just have to plant a cherry tree in honor of our first president. And I have to get an apple; those are the easy ones. The fig intrigues me— I like eating them, but I’ve never seen one growing.”

“I like them too, so we’ll go with those. They said they could have them delivered later today, so let’s go home and start digging.”

After planting the trees, we began painting. The few times we’d painted at earlier apartments, we’d developed a method that matched our strengths: Bev painted trim since she had a steadier hand, while I did the rolling. While painting, we talked through other plans for the house: furniture we'd need, higher energy appliances, curtains, planting a vegetable garden, and getting bikes for short excursions.

"I'd like to get some more trees," I told Bev the following day. "There's this website Kat told me about where you can get them much cheaper than a nursery; they're basically small sticks with bare roots. You plant them in the fall, keep them watered, and they grow just fine."

"How many more do you want?

"I'd like to plant our entire yard with trees except where they'll shade the solar panels. I'll need to do some measuring, but I bet we can fit a couple dozen."

After work the next day, we made the measurements, selected tree varieties with high carbon capture qualities, and calculated how many we could plant in our yard.

"Twenty-six sounds like a lot," Bev said. "Especially compared with our four measly fruit trees."

"I want them really close together, but we can get more fruit trees if you'd like."

"No thanks, I looked up how much fruit we'll get from these, and I'll be making lots of jam and applesauce as it is."

We finished painting the kitchen in two nights and moved in the items we'd brought for it the following. We repeated the process for the master, finally seeing real progress as the spare bedroom was visibly emptier. Plus sleeping in our own bed renewed our vigor; we seemed to work with added enthusiasm the following week.

We even broached the subject of kids, normally a taboo subject. Bev started it while painting the spare room by saying aloud, "When we have kids, let's put up an animal border." When I looked over at her, she was studying my face as if to see my reaction. I gave a noncommittal smile and resumed rolling but began thinking through the possibilities. A little later I responded "How about Disney characters instead?"

At work, things just kept getting further behind. With the house in such disarray, I couldn't work from home and only managed to stay afloat because Bev finally told me to start working extra. I was becoming so agitated, that she knew she had to do something.

“Just till you catch up,” she said after another of my cursing escapades from hitting the hallway ceiling with the roller, causing extra repainting. “And I’ll start doing some decorating projects.”

Our forestation project was due for a report out at Charlie’s next staff meeting, so I spent the extra hours getting caught up on the group’s work.

“The team’s come up with a great strategy,” the project manager, Derek Boston, began. “We’ve developed software that works a little like Google Earth. It overlays existing land uses on a property then calculates the remainder to see where more trees can be planted.”

They’d come up with graphics for every category of land: homesteads, businesses, ranches, and public spaces. The hardest part had been to capture existing trees, but the team had finally finished the software that pulled their size and location from existing sites. The country was regionally divided, showing which species of trees grew well and had high carbon capture properties.

It took a several more weeks evenings and weekends to finally get the house in shape and setup to work from home. Then I began setting the alarm an hour early and dedicating the time to analyze the details of the India desert project, using it to refine our model. I wouldn’t have any improvement to report yet, but having their project already in the works had proved a big benefit for modeling.

I began the staff meeting with the forestation project. To illustrate our tools, I used a typical homeowner’s property showing the house, garage, driveway, shed, and existing landscaping with appropriate borders around each. Then it divided the remaining land into available tree planting sections, automatically updating the sizes based on the region and selected tree type. I reviewed the other land types then summarized the entire project by showing that less than ten percent of the available land was needed for planting trees to meet our goal.

“You do mean land with nothing else on it?” Charlie asked.

“Except maybe grass. Of course some of it’s hilly or not very fertile, but the website gives planting tips on how to deal with common issues like those.”

“What are we doing about their future wildfire risk,” the president asked, “I don’t want them burning down in a few decades.”

“Most will have a very low planting density, and not a significant fire risk,” I answered.

“But we can’t guarantee they’ll all be very low risk,” the president responded. “Charlie, I want one of our wildfire prevention teams assigned to this project while we work out the details. We’ve finally made some headway with our strategies, and I want to make sure we incorporate everything we’ve learned into this.”

Next I reviewed my India visit, detailing both the successes as well as the remaining issues.

“Well at least we know it’s doable, but I was hoping you’d have a higher planting density to report, so keep working on it. I haven’t made much progress on the land use issue either. As you can imagine, it’s a political hot potato and proving as difficult as solving a Rubik’s Cube in the dark, but I’ve got a few more ideas. I’m planning to use the low densification to our advantage, making promises to not plant sections when no other solution can be worked out. The historic photos showing acre after acre of crops on the land have been helpful to initiate the discussion. You have no idea how many congressmen immediately said it just couldn’t be done. It shuts them up quick when I show them it isn’t something new, just on a larger scale.

“But I do have some good news from Mexico’s President Fuentes. He was very interested in doing a joint project and pooling resources. Turns out you were right Joe— they had looked into doing it but concluded the irrigation would be too expensive through the mountains. Having access from across the border makes it far easier. He was equally concerned about maintaining their desert environment since they have even more indigenous people and protected species living there than we do. He has high confidence in his climate change team and feels they can help with that issue. He’s setting up a visit for us to begin working on the details.”

Chapter 10

Joe and I both underestimated the amount of detail involved with the closing process. Joe handled most of the paperwork, scheduling, and communications since he had more flexibility during the workday while I did what I could in the evenings, like pulling together financial information for the mortgage application and doing the on-line forms. Once that part was finally done, we began sorting through the stuff we'd acquired over the years to figure out what we wanted to take to our new house.

"Let's just call a Salvation Army truck and let them take everything but our bedroom set," Joe said after we'd spent consecutive evenings arguing over what to keep and what to toss, but we had hardly made a dent in the total.

"No way, what about our dishes that were a wedding present from your parents or the sofa that we've spent so many evenings curled up on? Aren't you the least bit sentimental?"

"I'm just tired of reliving every piece of furniture and knick-knack, trying to make a decision. Frankly, I don't remember where most of it came from anyway, much less care."

"Well I do, and many are important to me. Plus I've already given some thought about how to incorporate them into our new place."

"Fine, you sort through it all, I'm going out for a burger and a beer," he said, then left after grabbing his jacket.

I was upset he left but relieved he was gone. I asked myself how that was possible, but I didn't have an answer or know whether I should be mad or pleased with him. I didn't have long to think because, within a few minutes, he called.

"I'm sorry, I'm on my way back to help sort through the stuff."

"I know I was driving you crazy, but we're just different in our approach. How about you take that break, eat your burger, and then come back with a burger for me? And don't forget the beer."

I was sorting through kitchen cabinets when he got back.

"I had a brainstorm while you were gone and called my girls night out group. We scheduled a special session for Saturday. They'll help me sort through my stuff so you can focus on yours. When we get those done, we'll do the furniture and kitchen together."

"I like it," he said, giving me a kiss. "Thanks."

"Now, where's my burger? I'm starving."

After the move, our schedule got even worse. We had so many projects in the evenings and weekends there were no breaks for either of us. Joe was getting progressively crankier but I knew it was his work that was bothering him, not the house. I knew it was time to do something about it, or we were sure to have a bigger blow-up, destroying the progress we'd made. After thinking over the options while painting, I told him to work late till he caught up and I'd start the decorating projects. His demeanor changed almost overnight. The house projects slowed, but at least when we did work on projects together, we enjoyed them.

At the office, the soil trials had slowed now that it was summer. Data was still coming in since we tracked things like the weather, crop status, pests, and weeds, as well as year-round soil sampling, but we found ourselves with extra time to catch up on analyses and begin the yearly report.

Amy and I continued our walks whenever there was a Taps; the walks had become our sanctuary. One disaster that had recently occurred happened after heavy spring rains in the Ohio Valley caused the Ohio River to be at dangerously high levels. When a storm stalled over Louisville and dropped nearly a foot more, it flooded its banks near downtown, destroying hundreds of homes and businesses. In addition to the economic devastation, there were fourteen fatalities.

Another disaster which occurred over several days, included multiple floods in the New York and Pennsylvania Adirondacks. Their warm spring led to a quick thaw, swelling creeks, streams, and rivers to their max. When the heavy rains came, water overflows happened quickly. Evacuations saved most, but countless homes, roads, and businesses had flooded. Several downstream towns had combined storm sewers and sewage systems causing, raw sewage to contaminate water sources, leading to several hospitalizations and multiple deaths.

Like Joe, I had also begun checking the international site for news on Oscar's islands, leading me to do added research. I was feeling the beginnings of an idea.

During these Taps walks, we often discussed Amy's tutoring and other work with foster children.

"What are the kids like?" I asked one day while dodging puddles after a late spring rain.

"They're pretty normal and do the same kinds of things as most their age: hang out with friends, play video games, and try to get out of doing homework. I tutor ages five to twelve, and it varies greatly by age. The younger ones tend to be a little sadder than most their age since their parents aren't around. The older ones often have moved to anger and act out more. The kids are in the system for a variety of reasons, but the most common is drug use of a biological parent. Most were down to a single parent, usually the mom, when something would happen. Either they died of an overdose, ended up in prison, or neglected their kids when they were high.

"Many of the kids have problems at school which is why there's such a need for tutors. The foster parents I've met come in all kinds. Most have the genuine interest of the child at heart, but some are just in it for the money. I can usually tell which one they are after just a visit or two. People don't clean up for a tutor like they do for a case worker, so I get to see what the home is really like. The truly caring ones take an interest in the tutoring and make sure there's a quiet place for our studying. They're often in and out during the session, and some will even question the kids on our topic to make sure they're paying attention. I seldom see the ones just in it for the money, and it's usually loud and chaotic during my visit."

"Damn," I said, distractedly walking through a large puddle, soaking my open-toed shoes. "With your foster home background, it must be hard seeing the homes where foster parents don't care about the kids."

"I try to give those kids extra attention and hope it helps. Not many have an older brother like I did, who went out of his way to comfort me."

"When you talk about foster kids, I think about the orphans who Joe's friend Oscar is trying to find homes for in the Marshall Islands. It seems like they have problems on a different level."

"I don't know much about the islands, where are they?" she asked.

"They're a group of Pacific atolls not far from the equator, about half way between Hawaii and New Guinea. The most famous is the Bikini, which the bathing suit was named after. But that's also where nuclear testing was done during the Cold War. It still has high radiation levels and is unfit for humans.

"American forces captured the Islands near the end of World War II and later worked out an independence agreement, which compensated them for the testing destruction. I discovered that part of that agreement allows the Marshallese to come to the U.S. for work or study without restrictions on their stay, so I've been looking into what that means for potential adoptions."

"Sounds like you've got something brewing."

"I've been thinking about starting a personal work group to increase awareness for Oscar's orphans. I want to speed up getting them placed and figure there's no better place than our department to understand their hardships. There are several steps to the adoption process; I want to learn their ins and outs and then help interested couples maneuver through the adoption process easier."

"I'd love to help, and having gone to so many climate change anger group meetings, I could run one in my sleep."

That night while painting the kitchen, I told Joe about my idea.

"That sounds like a terrific idea. Have you contacted Oscar? He'll be overjoyed."

"He's thrilled, we're going to talk on Saturday to start working out the details. I can just imagine the look on a child's face when they hug their new parents for the first time."

"But there'll be disappointments along the way too: forms, bureaucracy, and long waiting periods. Be prepared for both the ups and the downs."

"I'm expecting an emotional roller coaster, but I think the joy at the end of each one will be worth any red tape along the way."

Chapter 11

I was enjoying a cup of coffee in my new study on Monday morning, reminiscing about how enjoyable the previous day had been. The birds were even cooperating, chirping from one of our new bird feeders. Bev and I had taken our first bike ride to the park for a picnic lunch to celebrate finally completing the last of the house painting and final furniture arranging. There wasn't a cloud in the sky, but a light breeze kept us from getting too hot. We ate under a large maple tree, and then we stretched out to rest our sore legs for a well-deserved nap. After waking, we toured the park enjoying the smell of flowers in full bloom before pedaling home.

I poured my second cup then opened an email from Jennifer, calling an impromptu staff meeting for that afternoon. Jennifer was my direct boss and bridged the gap between Charlie, Ross, and the technical staff. I never knew how she juggled everything on her plate, staying up to date on technical matters as well as handling the political aspects from Ross and Charlie. It was unusual for her to call a special meeting, and the invitation didn't provide any clues about why.

Bev awoke a while later, and I could hear her groan when she got out of bed. "Sore?" I inquired when she popped her head in the study.

"Aren't you?"

"A little, but coffee's helping." I was already pouring her a cup.

"I'll drink it with a Tylenol; I need both." She took a sip ten gave me a kiss.

"I guess we were a bit ambitious with our mileage for our first distance ride, but I sure had fun."

"I'm too sore to wash my own back. How about joining me in the shower to do your husbandly duties? If you do a good enough job, maybe I can skip the drugs."

"Darn, I was looking forward to reading more of these scintillating emails." I quickly shut down the computer and followed her to the shower.

I got to the office a little late but still in a terrific mood. My winning streak continued when I saw an email from Aarav with, "Latest hybridization results" as the subject line. Opening the attachment, I studied the information. They were positive results, not great, but directionally correct.

They had reduced irrigation by a third with 10 percent more fertilization. The best of the hybrids gave similar yields as their previous trial, and the adjacent lands had with very little flora disruptions. I fired up my workstation, updated our model with the specifics, and ran several simulations. I concluded with a study by looking at expected variation in the input data, and then I plotted the results for easier interpretation. The hours flew by and I caught myself smiling several times during the analyses, still enjoying this type of work. But I saved my biggest grin for the end: densification had improved to almost 25% before disruption to adjacent surroundings. Finally some progress.

My computer alarm let me know it was time for the staff meeting. As usual, on the way I stopped by Susan's office, and we chatted on the way to the conference room.

"Do you know why there's a special staff meeting?" I asked.

"Yep," she said, stopping to hold out her hand. "Congratulations are in order."

"What for?" I asked, shaking her hand in ignorance.

"You remember that little project you used to lead?"

"Conversion to renewable energy?"

"It's finishing next month."

"Terrific! But you deserve at least as much congratulations as I do; you've been its leader for the past three years."

"You know damn well you handed it to me on a silver platter, then followed it for another year to make sure I didn't screw it up even then. Face it, everyone knows this was your baby."

Even though I knew it was nearing completion, I couldn't help but break out in a broad smile at the thought of our seven-year project finally finishing. Not to mention the decades of conversions before the department formed.

Sure enough, Jennifer started the meeting with that announcement, warmly congratulating both of us.

"The president wants to showcase the project's completion nationwide. There's to be a national campaign on its results and benefits. I need you to pull together the information for the PR firm that's doing it. The campaign kicks off on the Fourth of July with the president making the announcement in the Rose Garden, followed by fireworks over the Capitol for added flair.

"I also wanted to announce that high level discussions with Mexico joining us on the desert project have finished. They've reached a top-level agreement, and we're now ready to enter detailed discussions with their team. Joe, you'll be leading those. The kickoff will be in Mexico City on July 13. Vice president Boswell will be representing the president and I'll be representing the department."

My thoughts went to what details would be needed for the Mexican desert. Since I'd been concentrating on the U.S. deserts, we'd need specialized maps, existing irrigation, and vegetation information along with a myriad of other details. Plus, I'd need to find out how much technical help I could expect from my Mexican counterparts so I could plan our staffing accordingly.

On the way back to our offices, Susan and I discussed how to provide the needed renewable energy information.

"I'll pull everything together," Susan offered. "You gave me all your notes when I took it over. You've got plenty on your plate getting ready for Mexico."

But I had other things to do before I could even start thinking about the trip. Most importantly, I had to pull more groups together to work on more of our carbon capture projects. The analysis portion of the forestation project was wrapping up, so there were some analysts becoming available who could be diverted onto other projects. I reviewed our selection algorithm and saw that our two ocean projects were next on the list, expanding kelp farms and phytoplankton platforms.

Kelp was excellent at capturing carbon from the atmosphere, so our main task was finding ways to sequester it so it didn't just return to the atmosphere when it decomposed. Phytoplankton, also a terrific carbon absorber, was at the base of the marine food chain, helping to increase all types of marine life. Carbon emissions made the ocean more acidic and reduced its oxygen level, making phytoplankton less abundant. Recent trials showed that properly designed platforms could produce abundant amounts of the microscopic ocean plant if nutrients from the sea floor could be better utilized.

At last month's staff meeting, two veterans from our renewable energy team, Gabriel Sanchez and Suzette Enders, had been assigned as their respective project managers. Since then, they'd been developing a strategy for meeting their individual targets. They would be thrilled to learn that two analysts each were now available to begin detail work.

Cal Horner was another experienced manager who'd transferred into my group last week, and I wanted to start him doing basic research on another project; increased soil fertility. Ever since Bev had begun on her project, she'd been keeping me up to date on its findings, plus I'd read several of the project's earlier reports. I knew the benefits they were seeing in agricultural soil could be transferred to all soils, thus improving its carbon capture everywhere fertility was increased. We just needed a way to do it economically. I met with Cal, showed him the reports, and we traded ideas on how to proceed until more analysts were freed up.

I also needed to review the latest on the air capture project; since it was scheduled for a status at Charlie's next staff meeting. I asked Bernice Cummins, the project leader, to bring me up to date.

"It's kicking my ass," she said right from the start. "There are just so many details to work out: where to put all the machines, how to power the fans, which absorbent materials to use, and what structural shape to adhere them to. The list goes on and on. The analysts are going around in circles because there are so many unknowns. They start down one path, run into a dead end, and then have to start over again. And I can't stop thinking about how much this project will cost; we'll be spending all this money to capture the CO_2, and then just bury it underground."

"I understand your dilemma, but don't lose heart," I counseled. "Try nailing one thing down at a time instead of several at once. I think designing the structure should be first, that way you'll know its size, shape, and material. Once you settle on that, move on to the absorbent material selection and then how to attach it. Once you work out these basics, more details will start to fall into place. Cost is a big issue. The president wants us to be creative in finding ways to offset it, so let me take that on and try to come up with a few ideas."

I spent much of the next couple days doing research on the potential uses for recovered CO_2 that wouldn't just release it back to the atmosphere.

Not finding any, I rethought my strategy and looked back through the options to discover which ones could displace existing fossil fuels, so at least it would be a carbon neutral alternative. I found several, many involved in the manufacture of fertilizers, plastics, and concrete. But also as a synthetic fuel component and to cultivate algae, possibly a help with our kelp farms. Analysis would be required to properly sort out these options to discover which were viable. I would have loved to work on it, but it would come at the expense of the desert project, which I wasn’t willing to forego. It would just have to wait till more analysts were available.

Having completed the immediate project tasks, I began preparing for next week’s Mexico trip.

Chapter 12

While we were fixing dinner one evening, Joe gave me the news that he needed to go to Mexico City for his desert project.

“We’re still getting settled into our new home. First India, now Mexico. Isn’t there someone else who can go in your place? Dammit Joe, what about that delegating you promised?” I was trying, unsuccessfully, to keep the anger out of my voice.

“You didn’t let me finish; I’m inviting you to come along. The meetings are on Monday and Tuesday, so we can fly out Saturday morning and spend the weekend sightseeing. I’ve already talked with my counterpart there, Antonio, who said his wife would love to show you around town while I’m in meetings.”

“I do have a little vacation time accrued.” I remembered. “It would be a nice break from everything. But I better plan a shopping excursion to get some proper things to wear; I don’t have anything that’ll work. I’ll call Fran after dinner to see if she wants to tag along.”

At the office, I’d begun working on a side study that Joe had actually requested. He’d been quite interested in our trials from the start and had even read all the back reports, mentioning how promising they were for carbon capture.

“Why haven’t I heard about this project before now?” I heard him ask himself on multiple occasions.

He’d since talked with Wanda, who was open to increasing its scope.

“Bev’s caught on so quickly, we could add your study to her plate if she’s willing,” quoting Wanda’s statement, the evening we were discussing his proposed study.

“It does sound interesting,” I said, after agreeing to the added work. “I just can’t imagine biochar being so important since I’d never even heard of it before now.”

Joe assigned a manager, Cal, to the project and spent a few weeks with him and a few others to pull together enough information for me to write code to do several analyses they wanted. We also added more sampling to the trials, expanding it beyond farm and pasture lands.

During the week there were two more Taps, sending Amy and me out on our walks.

"Serves them right for our continued traumatization." Amy chuckled when we walked longer than usual on a particularly beautiful day.

But the next time, it was raining, so we hopped the bus to a nearby coffee shop, and spent the next hour talking biochar, drawing curious looks from nearby customers.

We were into wildfire and hurricane season, and almost as if on cue, there was one of each. The fires in Montana were the largest in the state's history; six firefighters and sixteen residents were killed while fire consumed nearly two million forested acres. I couldn't help but wonder how much more snow in the Rockies would melt when all that soot landed.

The hurricane made landfall on the Mississippi Gulf Shores, killing thirty-three and damaging hotels, condos, and homes all along the beachfront.

On Thursday night while Joe was at his poker game, Fran and I met at a west side boutique, specializing in Latino attire. I told her I didn't want touristy clothing but more what the locals would wear around town.

"First, a comfortable dress for sightseeing to go with my walking sandals and one of my lightweight silk scarves. While I look for that, you find a Sunday night dinner outfit. We're dining with Joe's counterpart and his wife. Something fun, but not too risqué since we're meeting them for the first time and I'll be spending the next day with her."

I picked out three potential dresses for Saturday and held them up for Fran's opinion.

"I like the off-white one with the red Aztec design; it looks attractive yet comfortable at the same time."

It fit nicely, and I already had a similar shade red scarf that would be a good match, plus the length worked well with my sandals. I tried on the other dresses, but the off-white remained my favorite.

"Now try on these outfits for your Sunday dinner," Fran said, handing me four she'd picked.

I selected a mid-length black dress with red and white floral prints and a not too deep Vee neckline. Fran agreed that it looked pretty but not too sexy. We hunted together for tops to wear with the slacks I planned on wearing to Monday's outing with Alejandra. Since I wouldn't know what it would be until the last minute, I tried on several and decided on three to give me plenty of options: a pale orange, a floral, and a black with yellow vertical stripes, which matched my planned slacks.

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During our flight there the following week, Joe told me what he remembered about the city when he had been doing wind turbine installations in Oaxaca and had regularly flown into Mexico City.

"It'll be fun showing you around. Most of my co-workers dwelled on the negative: the mass of humanity, smog, poverty, and city sprawl, but I tried to look beyond to see the city colors, music, and aromas coming from the street. It was one of my first travels outside of small-town Ohio, and it intrigued me being so different from my monochromatic home town."

"I remember the jade jewelry and onyx figurines you brought back as presents. I wore the jewelry sometimes, but it wasn't my style. And those little statues were always of the indigenous animals and just didn't go with our décor, so they ended up in the donation pile when we moved to DC."

"I always knew you didn't care for them, but I had a soft spot for the little kids who were always hanging around the shops."

"Let's visit some together and pick out something for our new home, but no onyx pronghorn." I laughed as the pilot announced our approach to Benito Juárez International.

We saw the beginnings of the city taking shape below. Since there were few clouds, we could see for miles out the window.

"I bet I flew into here a dozen times, but I never saw it this smog free. It makes the city look even larger," Joe said, looking over my shoulder. "It always reminded me of Phoenix because of the hills on the city outskirts, but being more than a mile above sea level, the air is thinner than Denver's. Just walking around can make you gasp for breath until you get adjusted."

After collecting our luggage, we caught a cab to our hotel, Joe noting traffic differences from earlier visits.

"Several years ago, the roads were changed to deal with the smog and congestion," the cabbie replied." Priority was given to mass transportation and small electric vehicles, which has greatly reduced the congestion and the smog. I've only been driving for a few years, but Dad told me how bad traffic was for cabbies before the changes. Our twenty minute ride from the airport used to take an hour or more. Now every vehicle has to be electric or use biofuel like my cab. I have family who grow perennial crops they harvest for an uncle who runs the local refinery. Tourists tell me they really like the changes; there's not nearly as much noise, pollution, or chances of getting hit.

After arriving at the hotel, we left our bags with the concierge and asked for sightseeing recommendations.

"That's easy," he said. "Chapultepec Park is one of the best in the world. It's within walking distance and a great place to start your sightseeing. There are museums, gardens, a zoo, walking paths, places to shop and eat, and lots of benches to rest and enjoy the views. Once there, I'd highly recommend the National Museum of Anthropology which gives you a historical look from pre-Columbian to current day culture. This map shows the layout so you can plan what you'd like to see."

The brochure highlighted many attractions, but since it was such a beautiful day, we decided to just stroll around to see what we happened upon rather than going directly to one. We were immediately rewarded with beautiful lake views, a wide range of flowers, plants and trees, and even some critters for company. Along the path, we discovered several monuments commemorating battles, historical figures, and celebrated artists.

"I'm out of breath plus my feet are killing me," I said after a few hours. "Let's stop for lunch and just sit for a while."

There were food carts along the path with open benches to eat at. I decided on grilled fish on a corn tortilla topped with slaw and Joe got roasted pork on a corn tortilla with pickled red onions. We found a bench overlooking the Nezahualcóyotl Fountain, commemorating one of the fifteenth century Aztec leaders.

We spent several more hours strolling the park, nibbling on food, stopping to read plaques, and resting along the way. One of the lakes had paddle boats for rent, providing a refreshing cool down. We eventually came upon the anthropology museum that the concierge had mentioned. It was huge, beyond anything we felt up to, so rather than go in, we just walked the grounds and admired its impressive architecture. By seven we couldn't walk anymore, so we caught a cab at the park exit and asked for a restaurant recommendation for dinner.

The restaurant wasn’t elaborate, but the food was delicious. We let the waiter select our meals and he brought us house margaritas and chips for a start, then pozole rojo and fish tacos for entrees. During dinner we browsed brochures for tomorrow’s sightseeing, deciding on a bus tour that hit several popular attractions around town. We finished, but being too far to walk, caught a cab back to the hotel.

Our room was pretty standard, except for the Jacuzzi. On our wedding night, we’d made love in our suite’s Jacuzzi and repeated it whenever there was one in the room. I started the hot water while Joe opened a bottle of wine from the mini bar. We stripped, climbed in, and then turned on the jets when the water was high enough. We just lay enjoying the hot water on our aching legs while enjoying the wine, too tired to do anything more. Once the water pressure relieved some of our soreness, Joe moved closer, and we started kissing. But the water had already cooled, so I suggested we move to the bed.

“But we’ll break our Jacuzzi streak,” Joe protested.

“We’ll start another tomorrow,” I said, reaching for a towel.

The next morning we ate breakfast in the room and lounged around until it was time to catch the tour bus. It was a hot day, so we rode on the open-air top, letting the wind keep us cool.

“Don’t say anything about my hair, or I’ll toss you over the side,” I said, jealous about Joe’s short hair grooming advantage.

The bus stopped at several spots of interest and let everyone out for viewing. First, we saw the National Palace and its surrounding government buildings. This was followed by two art museums: the Palacio de Bellas Artes and then the former home of local artist Frida Kahlo. Lunch was at the Plaza de las Tres Culturas where there were several types of cafés to celebrate and admire Mexico’s different periods: pre-Columbian, Spanish colonial, and post-independence. The last stop was at the Great Pyramid of Tenochtitlán, commemorating the spiritual heart of the Aztec period.

The bus dropped us back at the hotel with just enough time to shower and change for dinner.

"I'm a little nervous knowing I'll be spending tomorrow with Alejandra— what if we don't like each other?"

"You get along with almost everyone except me when I work too much," he answered in his smart-alecky voice.

Ignoring him, I changed the subject. "What do you think about this dress? Too low-cut? What about the colors? Too flashy?"

"You look like a million bucks. Stop worrying."

When we got to the restaurant, the waitress led us to the table where Alejandra and Antonio were already seated. Alejandra wore a similar style dress, so I instantly felt more relaxed. Then she presented us with a beautiful bouquet of colorful flowers.

"They're from our garden; we hope they'll brighten up your room during your stay to make it feel a bit more like home."

"They're beautiful; that's so thoughtful," I said. "I'll ask the waitress for a vase so we can all enjoy them tonight."

Over drinks, we browsed the menu, while discussing our backgrounds.

"Antonio told me you work with endangered animals. Do you focus on any particular one?" Joe asked Alejandra after the waitress took our order.

"I do talks for organizations like schools, businesses, and government agencies, so I focus on them all. My favorites are zoos where I get to talk with families about the problems facing these animals. The children are often the most interested, especially when they hear about an animal they've just seen on their visit. Their favorites are the New World monkeys, the Black Howler and the Yucatan Spider; everyone loves watching them play."

"Are there many endangered species in your country?" I asked.
"Unfortunately. Mexico has such diverse climate, vegetation, and altitude, we're home to more species than the U.S. and Canada combined. So as the climate changes and vegetation cleared to make way for agriculture and industry, many of their habitats have become threatened. Many are mammals, everything from the large, like the Mexican bobcat and the Vaquita porpoise, to the small, like rodents and shrews. Unfortunately, we also have too many poachers who contribute to their already frail existence."

"Are you concerned for the desert wildlife if our joint afforestation project goes forward?" Joe asked.

"Very much. Antonio and I have "discussed" it several times. Don't be surprised if he asks you lots of questions about your plans to maintain the current population levels."

"I share your concern. Humans have exterminated and threatened far too many species already, we're taking every precaution to keep that from happening again. We'd welcome any suggestions you and your experts have to do even more."

"I'm glad to hear that, Antonio already has a lengthy list."

The waitress brought out our entrees as we continued our discussions.

"Joe tells me renewable energy is a big part of the reason for Mexico's recent economic rise. How did it happen?"

"The Paris Climate Agreement was really the turning point," Antonio replied. "A few years after its signing, renewable energy technology became a central part of our education. The sciences became the main priority in our schools, not just biology, chemistry, and physics, but environmental, with a focus on the climate and pollution aspects. After students understand the basics, they're taught the fundamentals of renewable power systems. Then they break the systems down to their components for more detailed study. Once our knowledge and skill base was developed, industry soon followed, because there was so much world-wide demand. The country set up public-private businesses to produce our own renewable components and systems, and exports soon followed. Now, renewable energy is the largest industry in our country."

This led Joe and Antonio to start talking shop, so Alejandra and I began our own conversation.

"What's it like in Washington? I'm sure Antonio will be going on this project."

"It reminds me of here a little, just with different scenery. We have lots of government buildings, statues and monuments, public transportation, and people going everywhere. We live outside the main area, where it's more laid back. We'd love to have him stay with us when he's in town. Tell me about your kids."

“Pablo is five and Juanita three. They’re with Antonio’s parents tonight; they love having them.”

“Do they go to day care when you’re at work?”

“We’re lucky; we both have stay-at-home sisters who take turns watching them. I don’t think I’d be able to work without their help.”

As we finished, Alejandra asked me, “I’m really looking forward to showing you more of our country tomorrow; what would you’d most like to see?”

“We’ve seen so many sights this weekend, and I feel like I know your country better. Your talk about zoos and endangered species made me want to visit one, and I’d love for you to bring your kids along so I could meet them. Perhaps you could also share some of your desert wildlife ideas with me so I can ‘discuss’ them with Joe.”

Chapter 13

The next morning, I was scheduled to be downtown at nine. Bev wasn’t meeting Alejandra till later, so I quietly got ready, to let her sleep in. Vice-President Boswell’s plane was being met by Mexican Foreign Affairs staff who’d bring all our contingent along. They pulled up just as I was entering the lobby. I’d first met Vice-President Boswell when she was governor of Florida, and our team was working on wave and tidal hydro-energy installations to help protect its southern coast. She was a hands-on style governor who welcomed our team with open arms, offering any help she could provide. She fully realized the many climate dangers her state faced and was consumed by wanting to keep her citizens safe. She became so knowledgeable about it, she was an informal advisor to President McGregor, helping set policy as well as lobbying other governors for their support. She occasionally attended Charlie’s staff meetings with the president, and it came as no surprise to me when she was selected as Hawkins’ running mate.

After shaking hands, they escorted us directly to a large third-floor conference room where we were greeted by several people, including Secretary of Governship Miguel Hernandez, the closest position to our vice-president. After introductions and an invitation to get refreshments, we all took a seat, and the Secretary officially welcomed us, saying a few words of encouragement and pledging his administration’s full support.

Esteban Gutiérrez, head of their environmental agency, spoke next. He’d been the speaker at the UN meetings earlier this year, giving their country’s impressive results, though short on most details. Now he had the authority to delve into them. He began by explaining that hydropower was their leading renewable with much of it coming from wave and tide capturing systems on both coasts. He described some of the innovations that had improved their efficiency and reliability, similar to what I’d heard from Antonio and Ronaldo in New York. Then he spoke on their other renewable methods: wind, solar, and methane capture, and he detailed how they handled the intermittent nature of their renewable energy. Since waves were continuous and the tides went in and out four times daily, they had a head start relative to some of our methods. They combined those with hybrid solar and wind farms, explaining that by having them co-exist, they could keep a more localized grid and still provide continuous power without much storage. This kept their costs down, enabling them to more quickly put renewable systems in place rather than spending that money on storage.

Next he detailed how they would reduce emissions to .1 GT with their planned projects over the coming years. These plans included increased forest fire prevention, conversion of tractor-trailers to biofuel and electric, increased livestock manure methane capture, and a focus on alternative methods for rural areas still burning wood, coal, or oil for cooking and heat.

He began his discussion on carbon capture projects by saying they were still in their infancy, so their details weren't fully developed. Their main focus was on increasing forestation and biofuel production from nonproductive lands. They would use a variety of methods to improve the land's ability to produce crops, such as augmenting the soil, leveling where necessary, and irrigating. Since biofuel produced lower emissions when used, it would be a net savings versus using petroleum. They were also developing their own carbon air capture methods to minimize its operating cost but were several years from its implementation. His projections showed gradual carbon capture increases up to ¼ GT over the next decade.

With their economy so focused on climate change technology, Mexico had enthusiastically signed on to last year's global treaty and was on track to become net zero by 2052. But when he gave their negative commitment of ⅓ GT, I quickly did the math in my head. With their planned projects, they wouldn't meet their pledge. This explained their interest in participating in our desert project: they needed more carbon capture.

The last speaker before lunch was Luis Martínez of their Finance Ministry. Luis reviewed their renewable exports, showing high dollar amounts from their systems, primarily hydro-electric and wind turbines. Then he showed the income levels of their universities, noting that most of the importing countries sent representatives for training. Lastly, we saw Mexico's gains in per capita income and employment, as well as their reduced poverty and crime rates since the Paris Agreement.

At lunch, I sat next to Antonio and thanked him again for dinner last night and for Alejandra taking the time to show Bev the zoo today. But then I steered the conversation back to the subject at hand. After hearing about their hydropower innovations all morning, I wanted to discover its potential on our desert project. I'd planned all along to use wind turbines for powering the desalination and pumping plants, but with today's revelations, perhaps hydro was a viable alternative. I gave him a summary of the power needs, and he followed up with additional questions before doing his calculations.

"We'd have to study whether wave or tidal would be best. For a project this large, perhaps both would be the way to go. If we assume that route and use areas with high ocean forces, here's a cost estimate based on others we've done that were a similar size."

It was lower than my estimate for wind power, certainly worth further study in light of Mexico's reliability improvements. We talked for the remainder of the lunch hour about its potential, ignoring the others at our table who were carrying on their own discussions.

After lunch, we reconvened, and the vice-president spoke first. She thanked our guests for their warm hospitality, the openness of the morning's discussions, and the opportunity to work with their talented staff. She let them know that everyone from President Hawkins to Charlie was anxious to work closely with them on this critically important project. She outlined how much technology the U.S. was prepared to share with their southern neighbors, and then she introduced Jennifer.

Jennifer began by describing the global climate meetings last year where the revised targets were established.

"I was at the week-long technical meetings, as was Esteban, and they were quite sobering. Hour after hour was spent seeing temperature increase, sea level rise, ocean acidification, and man-made emission measurements from all over the world. Then we listened as country after country gave heart-rending testimony on the tragedies they'd caused their people. The economic devastation figures came next. There had been damage and destruction to infrastructure of all types: homes and businesses had been ruined beyond repair. Bankruptcies were far more common than the disasters that had caused them. People strained by the ever-mounting taxes needed for repairs. Skyrocketing insurance rates— if even available, added to the misery. The room was constantly abuzz with shared experiences.

But when climate scientists showed feedback measurements, you could hear a pin drop. There were ever-rising emissions from the thawing tundra of the vast northern plains. Methane plumes were forming as the frozen Arctic thaws earlier and more extensively every year. Rain forests were not getting enough precipitation to sustain their vast carbon capturing vegetation. Non-stop wildfires raged across the globe not only releasing their enormous carbon stores, but also spreading its black soot, further contributing to warming and breathing problems. But perhaps the worst news was the Antarctic glacial melting rate and the up to twenty-five feet of sea level rise that would occur in just a few hundred years.

"Analysts spent the entire day taking us step by step into how they were finally able to project these feedbacks going forward. Combining the mountains of measurements and data had only been possible using the computing power of the world's largest networks.

"The last day, they took us through the recently revised projections, adding feedback to the previous ones, which hadn't included it. When they showed the combined results, the room grew silent again as we realized we were on the brink of not being able to stabilize climate change.

"Every country left with the assignment to come up with revised plans to get to net zero as quickly as possible. The importance of the timing was emphasized by knowing that every gigaton of man-made emissions between now and the net-zero year would eventually need to be extracted along with the fast-growing feedback levels.

"Simultaneously, meetings were being held with the nations' foreign ministers. They were tasked with figuring out how to make the revised plans mandatory with enforcement measures for ensuring success. They understood the critical need to be successful and devised a strategy using heavy fines based on a nation's GDP for not meeting their commitment. On top of that, punitive trade embargos would be enacted by member countries if a nation wasn't making appropriate efforts to meet it. But they realized they also needed a carrot, something to encourage countries to overachieve to offset those who might fall short. Several ideas were discussed, but they settled on allowing non-complying countries to purchase credits from the overachievers.

"Three months later the nations met again, each with their net-zero timing. As expected, there was a range of time durations, everything from eight to fifteen years, along with their annual emissions until reaching net-zero. Using a pre-prepared algorithm, calculations determined what the negative emissions needed to be for each country. These were rates required to be achieved just a few years after net zero and sustained for decades to stave off feedback. Beginning with the longest duration, negative emissions and timing were calculated by country. But at fifteen years, the levels were too high and timing too short, so fourteen years was tried, then thirteen. Finally at twelve, most nations agreed the results were achievable. The countries that exceeded that timing were given time to reassess, and following lengthy negotiations, all agreed to it. Now every country has a negative emissions commitment with just five years after net zero year to meet it.

"Just as Esteban reported for Mexico, the U.S. can't meet our pledge unless we make the desert project work. We have a plan to achieve its success, and now Joe will take you through the details."

My title slide portrayed the basics: "Afforestation of southwestern U.S. and north central Mexican deserts using irrigation from desalinated ocean water."

The next slide didn't pull any punches. "The enormity of this project cannot be overstated. The U.S. is only considering it because there are no other viable options. Its scope is on a scale with some of the largest projects ever done in our country, but we have the resources, the need has been proven, and there's no other course. We're moving forward and profoundly grateful Mexico is joining us."

I began with an overview. Diagrams showing the desalination and power plants, pumping stations, irrigation lines seemingly running everywhere, and finally large groves totaling 25 percent of the desert outline. Next was a table showing the tens of millions of gallons of desalinated water needed daily, the many wind turbines to produce it, and the dozens of pumping stations needed to supply it. Then there was another table with the thousands of miles of irrigation pipeline, millions of tons of soil enhancements, and billions of saplings. The overview concluded with a summary of the timing, people, and resources required to make it all happen.

Then I went into details of the tree to be planted, or more scientifically correct, the shrub.

“The *Jatropha curcas* will be the primary, but others will be used to ensure a diverse habitat for robustness. This species was chosen for several reasons. First, it’s been shown to grow well in arid conditions in Mexico, India, and other subtropical environments similar to these desert regions. Second, it produces an oil-filled seed which can be harvested and refined into quality biofuel. Third, the remainder of the seed is an excellent organic fertilizer that helps replenish the soil’s nutrients. It’s previously been grown successfully as a cash crop in some of these same areas when oil prices skyrocketed earlier in the century. But more importantly, it has an excellent carbon capture ability under proper growing conditions. Lastly, our models show it to be the most viable option for keeping the rest of the desert flora and fauna intact.

“Even though Jatropha grows in arid conditions, it needs some water to survive and even more to optimize carbon capture and oil production. Since most of the desert aquifers, which once held enormous stores of water, have largely been depleted, we plan on doing the bulk of irrigation from desalinated ocean water piped from the Pacific. But once the groves get established, calculations show the surrounding areas will receive added precipitation, which we’ll use to supplement the ocean water.

“The desalination plant will use renewable energy for power. Wind turbines are commonly used to power our west coast plants needed due to their ongoing droughts, which made ground-water so scarce. But learning from Mexico today about their expertise and recent breakthroughs in ocean renewable power, we’ll explore those systems as alternatives.

“Other than its enormity, the project is scientifically straight forward—except for two significant issues. The first I’ve already mentioned: the potential damage to the desert environment and wildlife. Our modeling shows a high density planting will lead to significant destruction of the surrounding desert vegetation and the animal life that depends on it for survival. There’s also a significant indigenous population living in the areas that would be affected. So we're keeping densification low enough to prevent this.

"India has recently undertaken a similar project. After years of research to develop the optimum seed for biofuel production, they're now keeping the scale smaller than intended to minimize damage to its surrounding environment. They're running experiments to increase densification, and we're closely monitoring their results. Their biggest finding to date is to lower irrigation levels, hybridize the seed, and use added fertilization to tolerate lower moisture amounts.

"The other significant issue is the change to the weather in the desert and surrounding areas. Irrigation and afforestation will cause the desert to cool and surface pressure to increase. This typically leads to reduced rainfall in the irrigated areas and more in the surrounding ones. But the unique geography and magnitude of our project make this too complicated to model accurately. So we'll be monitoring any change to the regional climate pattern very closely as we progress.

"For carbon capture modeling, we've used India's latest hybrid results of eleven tons per acre annually. This is the combination of wood growth and oil production after reducing it for the amount of biofuel emissions during refining and usage. The U.S. sub-tropical deserts cover 143 million acres and Mexico's cover 73 million, so the total carbon capture is based on its density of forestation. We need about 30 percent of that land to meet our goals.

"For biofuel calculations, we've also used India's latest results. At maturity, they will produce 500 gallons per acre with the reduced irrigation. At 30 percent density, the U.S. share would be twenty-two billion gallons and Mexico's, eleven billion. The U.S. annually uses about forty billion gallons of diesel, so when the biofuel is combined with other biodiesel being proposed, it would give us the means to eliminate all diesel made from petroleum, a significant part of our emissions reduction plans.

"Before we can begin implementation, we need to figure out how to increase Jatropha density to 30%. With our modeling to date, we're only to 25%. But with your help, I feel confident we'll figure out how to meet it."

After I sat down, the group discussed tomorrow's itinerary of specific break-out sessions. The vice-president and her contingent would meet with

Miguel and his team to work out the joint program details for final governmental approvals. Jennifer and her counterpart would work out the specifics of information sharing between the two countries. I would be meeting with Antonio and his team of specialists for more detailed discussions. Afterward, we'd take a helicopter tour of the southernmost section of the Chihuahuan Desert with a stop along the way to see a grove of *Jatropha curcas*.

Dinner was at a nearby restaurant. Antonio and I again sat next to one another to continue our lunch discussion. If Bev were here, she'd have called me out big time for not being more social with the rest of the group, but we were deep into the details and both in our element. I seemed to have found my twin in Antonio.

What kind of soil additives did you model? How did you treat for soil acidity changes due to irrigation? What type of irrigation? Did you look at variable rates? What other tree species do you plan to interplant? How did you treat current population sites? These were just a sampling of his questions. Each one led to a discussion on what changes we could make to counter expected issues or increase densification. When dinner finished, we planned to continue our discussions tomorrow and get his specialists' input.

Back at the hotel, Bev and I shared our stories of the day while sharing a bottle of wine in the Jacuzzi. But long before finishing, we'd begun kissing and caressing, and a new streak of lovemaking to their relaxing jets had begun.

The next morning I met Antonio's four experts, knowledgeable on all aspects of the desert, Jatropha, and biofuel processing. Antonio had made notes from our lunch and dinner discussions, and we began by reviewing those questions. They were able to answer several, with the non-answerable questions being assigned for follow-up. Then the experts asked their own questions, and it was easy to see how Mexico had made such progress on emissions, as they all showed a thorough understanding. By the time our helicopter tour left, we'd made a long list of variables for modeling trials and a second list with follow-up, which would likely result in even more modeling. I was very hopeful that we'd made progress towards our target and couldn't wait to get started on the analysis.

The helicopter tour of the Jatropha groves proved insightful. During my India trip, I'd seen large groves growing in the desert, but they were still fairly small with plenty of spacing between them. These bushes were fifteen to twenty feet tall with full green foliage and almost no distance between them. The nuts weren't visible from the helicopter, but Antonio assured me they were dense in the leaves. One large grove had a refinery on site. Through headset microphones, Antonio and his team of experts gave me specifics on the various aspects of biofuel production.

On our way to the Chihuahuan desert, Miguel, one of the team members, gave me an advance description of what we would be seeing there.

"It's one of the largest and most diverse in North America. Over the years, overgrazing and urbanization have reduced some of it, but there's still a wide variety of shrubs, cacti, and grasses, just sparser than it used to be. Similarly, there's lots of wildlife with pronghorn sheep, foxes, mountain lions, coyotes, wolves, antelopes, bobcats, mule deer, as well as many species of birds, reptiles, butterflies and amphibians.

"Much of the desert sits between the Sierra Madre Occidental to the west and the Sierra Madre Oriental to the east, restricting rainfall from both the Pacific and Caribbean, so the main source of water is the Rio Grande. There are many underground aquifers, but heavy irrigation from past farming drained most years ago. Summers are quite hot, regularly exceeding one hundred degrees in American units. Winters usually stay above freezing but sometimes drop below with some snowfall, especially in the mountains. There are several large urban areas such as Ciudad Juárez, Chihuahua, and Saltillo, with desert populations of several million."

As we passed into the desert, it was easy to see the changes in the land. Trees, shrubs, grasses, and the occasional stream or creek gave way to sparse cacti, brush, and grass for miles without a water source in sight. There was no visible wildlife except an occasional small herd of sheep, but I realized, at this time of day, many would be hidden in their burrows, under shrubs, or among large rocks to protect themselves from the sun. Helicopter noise was surely scaring others away. It was hard to imagine groves of Jatropha in this water starved, brown, rocky environment. It gave me pause to think how much effort and resources it would take to make the ground fertile enough so our drought tolerant tree could thrive. Antonio must have read my thoughts because he said essentially the same thing into my headset just a few minutes later.

On the flight back to the city, Antonio reviewed the wildlife protection ideas that Alejandra and her associates had generated. It was an extensive list of items based on their experiences dealing with endangered species. Some of them we'd already planned on but several others were new. At least we were already doing one of the primary suggestion's, getting more accurate wildlife counts before work was even begun. That way we could measure how much impact the project was having every step of the way, and take more drastic measures to keep wildlife intact if needed.

It was late, and I was exhausted by the time I made it back to the hotel. Bev had already packed our luggage, checked out, and was waiting in the lobby. The driver rushed us to the airport where we boarded after clearing customs. I fell asleep soon after take-off and didn't awaken till touch down at Dulles.

Chapter 14

After we returned from Mexico, I got started on house decorating. I began by inviting friends over for suggestions on Sunday afternoon.

"The first thing you need to do is get some color in your curtains; the white ones from your apartment won't cut it anymore," Rita began.

"Since you've already painted the walls; let's go room by room and see what else to coordinate them with," Fran added. "We'll start with the master; are you keeping the same linens?

"Joe likes it dark for sleeping, but I'm tired of the brown and been thinking about a navy blue."

"How about this?" Maria asked, showing us a home decorating website that let you enter basic information on your room, then choose options from their site. "Here's a navy-blue bedspread with sheers and matching curtains. You can easily change styles from this drop-down menu."

I scrolled through several styles, let the others comment, and then saved the ones I liked. We proceeded to the living room next.

"I want this room to be especially bright and cheerful. We both like the size and feel of the sofa, so I'm thinking of having it reupholstered. But we need new chairs; the old ones were so worn and dingy, we didn't even bring them when we moved."

"I know a lady who does upholstery out of her home; she's good and reasonably priced. Pick out the fabric you like, then I can ask her for a quote and lead time," Fran said. "I've noticed a fabric store in the strip mall not far from here."

"Let's see if she does custom drapes too," I said. "I've always wanted something unique."

"What kind of chairs are you thinking about, recliners?" Maria asked.

"I like recliners, but Joe prefers an easy chair; he doesn't like his feet up, and says it makes him fall asleep too easily."

"Isn't that the point?" Maria giggled.

"We're planning a furniture store trip, and we'll try out several once I know the basic color scheme."

Next, we tackled the nearly empty dining room.

“I’ve already got plans for this room,” I said. “Joe’s poker buddy, Rick, builds furniture, and I’m going to ask him to make us an oak table I’ve got in mind. Then I want to find chairs and a hutch at an antique or consignment shop to go with it.”

“I love looking through those kinds of shops, let me know when you go,” Fran said.

Then we moved to the guest bedroom.

“There’s nothing here either,” Robin commented after opening the door. “Is Joe’s friend going to make you a bed too?”

“We used our apartment’s guest room for an office, so we didn’t have anything to bring. I want to keep it simple and not break the bank on a room we’ll seldom use. But I don’t want to wait too long; I’d like to have our parent’s over before too long.”

“I have a co-worker who’s retiring and downsizing, would you consider something used?” Rita asked.

“If it was gently used. I just want a bed, dresser, and side tables.”

“I’ll talk to her tomorrow and see if she has pictures and the bed size.”

We browsed Maria’s website and found an off-white bedspread with matching drapes; then we picked throw pillows with some color to make it more interesting.

“I want Joe’s input on the den— it’s his favorite room in the whole house. So we just have the other bedroom left,” I said, leading the way. “It’s our future baby room,” feeling a twinge of emotion. “I thought we’d just leave it empty for a while, but all of a sudden I’m not so sure.”

“Uh-oh,” Maria said. “I know that feeling; your maternal clock’s starting to kick in.”

“Is that why I’m visualizing a pastel paint color, an animal border, crib, and changing table?”

“Did you and Joe decide to start without telling your little sister?” Rita complained.

“Don’t fret, we haven’t discussed it seriously yet, just some offhand comments, but maybe it’s time.”

It was getting late, so I made plans with Fran to visit the fabric store on Sunday, then to go linen shopping with Robin and Maria next Tuesday.

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At the office, I had begun on Joe’s added study, using my new coding to do carbon capture estimates from the fertility and other data from earlier studies. Cal was often at my side as I analyzed the results, advising me on any additional analysis to perform.

He was there today when a Taps sounded. I excused myself, telling him I was taking a break.

“Damn it, you can’t leave now; we’re in the middle of this,” he growled.

“It can wait till I get back,” I retorted, walking to Amy’s desk, already seeing her waiting.

“I’m going to mention this to Wanda,” he said, marching towards her office.

Ignoring his outburst, we took our walk, which I monopolized initialized with details from our Mexico City trip.

“While you were off gallivanting,” Amy said after I had finished, “I got our meetings about the Marshall Island orphans set up for one of the days we discussed. It’s a go for Wednesdays at three on the fourth floor of the international building. When I put us down as joint leaders, it automatically sent out invitation emails to all the people attending the same meetings as we currently do, and then it added a new meeting notice on the website’s home page.”

“My only group is the one on housing, which doesn’t have many members, but your anger management is so popular, we may get a big turnout,” I said hopefully. “I’ll forward the invitation to my orientation pals to see if they know anyone who’d be interested.”

“I created this outline for our first meeting,” Amy continued, handing me a handwritten sheet.

There were two information sections, followed by the group discussion. The first section was an introduction to the objectives of the group and background on the Marshall Islands, including the reasons why there were so many orphans. The second was an outline of the adoption procedures.

“I talked with Oscar, and he’s got one main request: to set up a video conference so he can link in with his kids. He wants to introduce them and let them tell a little about themselves. He says it's the biggest draw for prospective parents."

"That'll be easy. I'll just bring along my computer; it's already set up for video calls. We just need to send Oscar the call-in number."

"Perfect," I said. "I'll do the intro and background, and you do the rules. After, we'll have the call featuring the kids. I bet there won't be a dry eye in the place."

When we got back to our quad, Wanda asked us both to come into her office.

"Cal was pretty upset when you left in the middle of the analysis," she began. "But I got him calmed down after explaining how upset you both get when the alarm sounds. I don't think you'll have any more trouble, but let me know if you do."

I called Cal when I got to my desk and he apologized for his rude comments.

"It's just that Joe is so excited with these results; I didn't want to disappoint him when I got back empty handed."

"He's well aware of my feelings about the alarm; just mention that, and he'll be fine with a short delay. Come back in the morning, and I should have everything ready that we discussed."

But before I got back to the carbon capture estimates, I checked the disaster website. Drought conditions in several Southwestern states, including California, were causing huge losses in crops and cattle. Poor Californians, they'd been hit off and on with drought for decades, but this one also included much of Arizona, New Mexico, and western Texas.

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That evening, Joe told me he'd been working all week, analyzing the ideas from Antonio's group to increase the desert forestation.

"There were so many factors to investigate, that I began with a statistical approach using design of experiments, you'd have been proud of me. Lots of model building, data analysis, and reruns to account for variation. Several of the ideas had small impacts, each improving densification a little until I nearly hit the 30 percent target. I did more runs yesterday and densification kept increasing. This morning I finished with the optimization run, we're up to 38%. We finally made it!"

We celebrated with a bottle of wine and love-making, but in the back of my mind, I was thinking about the baby's room. Every time I passed it, I'd look inside and let my mind wander. Sometimes, I'd wonder about how nursing would feel, other times I'd imagine my baby's laughter. If this wasn't a sign, I didn't know what would be. It was time.

On Saturday I brought Joe up to date on my decorating plans, taking him room to room pulling up our ideas on the website. When we got to the den, I asked for his thoughts. "I'd like to go antiquing with you on the hunt for dining room furniture. I want a big old-fashioned desk, it's a big enough room for it, and it'd look great with the dark woodwork."

He also liked my idea of asking Rick to make us a dining room table.

"He's recently finished a big project and bought a new lathe, so he can make us some neat table legs. How about you plan something with Jane next week on my poker night; we can get there early and show him our ideas."

I saved the baby's room for last, "This is the only room I didn't plan; it's for our—" but I began softly crying and couldn't finish the sentence.

Joe held me, and I could see tears in his eyes too. After a few moments, I regained some composure, "I'm ready. We're settled in our new house, and I don't have reservations about us any longer."

"I'm ready too," Joe said, staring into my eyes. "I never had any doubts we were right together. So what are we waiting for, let's get this show on the road."

We headed to the bedroom, and after we finished, I lay against his chest, luxuriating in its warmth. I felt so secure and loved, I didn't want to leave until our baby was on its way.

Chapter 15

The weeks following our Mexico trip were so full of special events it made my head spin. First, the president announced the closing of the last fossil fuel power plant, officially declaring the start of full renewable power. That was followed by a blazing fireworks display, and then the professionally done PR campaign that Susan had helped pull together. We'd talked several times about making sure it emphasized the public as largely responsible for its success, which it accomplished with flying colors. The ads flooded the networks, cable, and social media. Many of them used current popular songs or old standbys, but a few created their own originals, becoming hits in their own right.

Next, the department announced a celebration picnic at the main complex for employees and their families for the last Saturday in August, just a few weeks away. There would be a catered lunch, kid's activities, tours of the complex, and several featured speakers, including President Hawkins, whose speech would be broadcast nationally.

A few days later in Jennifer's staff meeting, she briefed us on cabinet- and congressional-level meetings held since our return, trying to understand how Mexico had completed renewables before we had.

"We want to make sure it doesn't happen again with carbon capture. We're not really in competition with Mexico or any other country, but the reality is every country now reports out regularly on their progress, and the leader sets the bar for the rest of the world and earns the status that comes with it. Currently Mexico is earning the accolades and economic gains, but we're going to change that for carbon capture. We're going to lead this time.

"Those meetings produced a stronger commitment. We're going to hit net zero sooner, in 2048, and then increase negative emissions to ¾ GT. So by the end of the century, the U.S. will pull out nearly forty GTs of CO_2 from the atmosphere, greater than any other country. Joe's team worked out the details to meet our original target, but we need to further develop them and create even more to hit our revised target. The money to pay for the increase will come from the fees that other countries pay for falling short of their commitments, there are sure to be several.

"Joe, to accomplish this, your team will need to focus solely on carbon capture, and you'll be getting several transfers from the other groups to help with the workload. Susan, your group will be taking over the remainder of their emissions reduction projects, along with several of the new hires to complete them. They're more important than ever; implementation needs to speed up to hit our new targets."

While she was talking, I thought about what must have transpired to raise the target. When I told Charlie about hitting and even surpassing the required desert density, he must have relayed it to the president. Plus, the president was sure to remember the small percentage of tree plantings to hit its goal and figured he could get the public to surpass it. Congress would be salivating at the thought of overachieving our target and getting their hands on the funds that came with it. *Well whatever the circumstances, we've got our work cut out again, and just when I thought we had things well in hand.*

Jennifer's next item quickly brought me back to the meeting. "At the celebration picnic, the president wants to announce two carbon capture projects instead of just one. Joe, I know its last-minute, but do we have a second project close enough for its announcement by then?"

I had to think for a minute then replied, "It'll take some priority rearranging, but we'll figure out something."

"Okay, I'd like to see a draft of both by the end of next week."

Walking back to my office, I thought about which project to bring forward. The sequencing algorithm told us that the air capture project should go next, but Bernice and her team weren't anywhere near close enough. But the fertility project that Bev and Cal had been doing was just the opposite, exceeding my wildest expectations. After Cal's latest update, we had even increased its target, which I luckily hadn't relayed to Charlie, or we might have had an even higher target. I'll tell Bev tonight, and then get with Cal in the morning to work out details on how to proceed. My last thought before I got back to my office was on what was coming next— this week had been one thing after another.

Turns out I didn't have long to wait. Charlie's executive assistant called on Friday morning, inviting me to Charlie's office that afternoon. It wasn't unusual for Charlie to call something impromptu, so I didn't give it another thought. When I arrived Charlie, Ross, Jennifer, and two people I didn't know were already there. Charlie introduced them as part of the president's speech-writing staff, then got right to the point.

"At the department picnic, the president wants to present you with an award to commemorate your leadership on the renewable energy project. He feels it's important to put a face on the project, and your contributions make you uniquely qualified."

"I don't know what to say," I blurted out. "My first thought is I don't want to take away from Susan's work nor the entire department's, and that's not to mention how it was the public's efforts that caused it to succeed. I'm afraid everyone else's contributions would be overshadowed."

"I thought you might feel that way," Charlie replied. "So what would you think about having the award go to the entire country, but you accept it on their behalf? There's a Presidential Citizen's medal that's a perfect fit for this accomplishment."

"That would be much better," I agreed.

"You'll need to make an acceptance speech— not too long, just a couple of minutes saying the appropriate things. It'll be nationally broadcast, just like the president's speech. That's why his writers are here, so you can work with them on it."

"Okay, I'll pull some thoughts together this weekend then review it with them for input and polishing," I said, looking at the speech writers, who nodded their approval.

Saturday I began working on it. I'd never given a speech like this and struggled mightily with what to say. I deleted as quickly as I wrote; nothing sounded right. I finally gave up for the day, feeling my whole approach was wrong and wanting to start over, or just let the speech writers do it, then just read it at the ceremony. Bev suggested we take a bike ride to our favorite winery to help collect my thoughts.

Over a glass of Cabernet, I told her "The point of the speech is to convey a deep appreciation to the public for their efforts in replacing fossil fuels with renewables. But saying thanks isn't nearly enough. I'm trying to find a way to tell them how transformative it was. But at the same time, I need to tell them the job's not done. We started too late and have so much more to do. We haven't made the environment safe for their children, grandchildren, and generations yet to come. I want to tell them how proud I am but, at the same time, take them behind the woodshed for waiting so long. The renewable project will seem like a walk in the park compared to what still needs doing."

"I see your dilemma. But don't lose faith in the American people; they've come through time and again when the chips are down. Tell them what they've already accomplished, but be honest about what's coming next. They'll be there again, just like this time. I know it in my heart."

The next morning I awoke with a new approach and jotted down my thoughts. This time the words came more easily, and I didn't delete them. An hour later I showed my draft to Bev and she gave it an enthusiastic two thumbs up.

Celebration day arrived sunny, hot, and humid. I tried on a couple of outfits before deciding on casual navy-blue slacks with an off-white wicking-fiber polo shirt, which would hopefully keep my sweating to a minimum. I'd need a white shirt, jacket, and tie for my speech, but I'd store them till evening in the changing room set up for the event. Bev wore her Aztec-print dress and looked as beautiful as she had in Mexico. On the train ride in, I reviewed my speech for the umpteenth time. After arriving, we wandered the kid's area, watching them play on equipment delivered the day before. The heat wasn't spoiling their day, and their parents looked happy, sipping soda and iced tea. We both ran into co-workers with their families and chatted after introductions.

After a bit, we headed to the beverage tent for something cold. Bev noticed one of her team members, Cherise Taylor, with her family already at a table with drinks and snow-cones for the kids. Bev and Cherise introduced everyone, and we joined them at the table. Their kids were quite outgoing and joined the conversation, going on about the games and how much they were looking forward to the fireworks at dusk.

Next we headed to the music arena where there was a jazz quartet playing. I started taking out my speech again, but Bev whispered I already had it memorized and would just make myself more nervous.

"Just enjoy the music and a drink. It'll help you relax."

I noticed Goa Chang and his wife, Biyu, coming into the tent. Their children were already grown, so they were by themselves.

"Have you ever met your group's director?" I quickly asked Bev.

"A couple times," she confirmed.

"You're looking calm and collected," Goa told me after introducing Biyu and Bev. "I'd say cool, but there's no chance of that today."

"Looks are deceiving. I'm nervous as hell. I just wish the speech was over so I could enjoy the festivities like everyone else. They've put on a great day with something for everyone. I especially can't wait for the fireworks since it'll mean I'm done speaking."

We listened to the music a while longer, then I checked the time and realized we'd better eat so I'd be ready for the start of the program.

"Would you like to join us for dinner?"

"We'd love to," Gao answered. "I've heard several people comment on how good the food is."

"Where did you get that beautiful dress?" Biyu asked on the way to the food area.

"I picked it up for a trip Joe and I made to Mexico City a few weeks ago. We had a fantastic time; I'd highly recommend it."

We spent the rest of the dinner discussing our trip and new house, and a recent vacation they'd made to China to visit relatives.

After our ice cream dessert, I saw it was time to change and review my speech one last time.

"Since Joe will be seated up front with the other presenters, would you like to sit with us?" Biyu asked Bev as we left.

"That'd be great; I'm almost as nervous as he is."

We grabbed fresh drinks, and I headed to the dressing room, glad to be changing into a fresh set of clothes. Exiting, I noticed the several cameras to my left, reminding me of the national audience. *As if I needed a reminder*.

When the PA announced five minutes to the start, I scanned my notes one last time, took a deep breath, and repeated my usual speech mantra: *look above the crowd, concentrate on the words*.

The first speaker was Charlie, who welcomed everybody, saying he trusted all were having a good time, especially now the day's heat had passed and the evening was a bit cooler. He made his intro brief, saying how much he was looking forward to hearing the president speak, then introduced him to loud applause.

President Hawkins took the stage, made his way to the podium, and waited for the ovation to abate.

"Welcome to everyone here in DC and to all the citizens of our great country, watching at home. We come together tonight to celebrate a great victory, one of the most important in our country's history. I'm here with the people who created the projects, but make no mistake, we achieved this victory because of every one of you out there watching and listening, as well as the ones who couldn't tune in. Together, we ended our country's power reliance on fossil fuels. We all played a part in this victory, from the staff here, to the local leaders in every town and city across the country. But it succeeded because of people like you.

"We started with a plan seven years ago. It was to build on the progress that had already been made by using America's best two assets: its people and its natural resources. Phase one was putting you to work, saving energy so we needn't produce as much. You answered our call with more insulation, lower energy lighting, recycling and reusing everywhere possible, planting shade trees, treating roofs with reflective materials, installing energy-efficient windows, changing to geothermal heat pumps, upgrading to higher efficiency appliances, and countless other ways. You saved so much energy, you beat our most optimistic projections, allowing us to close unnecessary fossil fuel plants.

"The next phase was completing the upgrade of our electrical grid. This allowed you to create your own power with solar panels for your homes, farms, and businesses. If you didn't need power right then, you stored it or put it on the grid for someone else. The cost of the systems became more affordable as more were produced and led to tens of millions of you installing panels. Now we have more rooftop solar than any other country in the world.

"Next, we supplemented all those roofs with solar and wind farms in places with high solar radiation and wind speed. We created hybrid systems by combining them to improve their intermittent production.

"Then we refocused on hydroelectricity. We installed systems where there were already dams and reservoirs to keep from taking away more land from homes, ranches, and farms. We harnessed energy from the ocean and flowing rivers with efficient tidal, wave, and in-line systems, and at the same time, we added protection to our coastline.

"Next, we used our trash. We had lots of it in landfills producing environmentally harmful methane, so instead, we harnessed it to produce power. We also learned to environmentally burn it, saving landfill space. Farmers and ranchers added methane digesters to capture their cattle's waste gasses. We also harnessed more of our underground heat for geothermal power.

"Then we added enough power storage to ensure continuous energy whenever we needed it. You helped keep costs down by installing home batteries by the millions.

"Every time there was enough renewable energy to replace a fossil fuel plant, it was closed. One by one, with the last one on Monday. A huge victory. You have my eternal gratitude.

"Next I've got a special guest I want to welcome. The person who got this plan started seven years ago, President Stewart McGregor."

I didn't know he was going to be here, what a special treat seeing him again. We had a wonderful relationship over the years. He was even more hands-on than Hawkins and regularly attended our staff meetings to discuss the details. He wanted to hear everything, not just the positives, and he ended every meeting by asking how he could help.

He strode to the podium with a broad smile, to even louder applause than for President Hawkins.

"Thank you for your warm greeting. It's great to be here with you again. I made so many friends here; you'll always have a special place in my heart. And thank you to all the people watching; together we accomplished many great things, and tonight we celebrate your greatest achievement: the elimination of fossil fuels to create power. It's a defining moment in our country's history and will be celebrated for generations to come. I join President Hawkins in congratulating each and every one of you.

"But the devastation due to climate change continues, so we can't stop now. We've got a long path still ahead, even though we've made big strides. Many still suffer from the frequent and severe storms, wildfires, droughts, and the flooding it's brought. But because of all the carbon emitted over the decades, I hate to tell you; it's going to keep getting worse.

"We not only need to further reduce emissions, but we need to begin programs to take some out of the atmosphere, lots of it. But I know everyone here is up to the challenge and the people watching at home will be there every step of the way just like they were with renewable energy. Thank you all again for the opportunity to serve as your president; I still cherish every memory."

So this was Hawkins's plan to get the country to back our new projects, I thought. *Bring back President McGregor to help introduce them. Brilliant.* He not only was the most popular president since polling began, but his approval numbers had continued to go up since he left office due to his tireless work at disaster sites.

President Hawkins walked back to the podium and resumed speaking. "As President McGregor said, we still have a long way to go. I want to tell everyone about something you may not have heard about much. It's called feedback. Everyone's all too familiar with the devastating consequences of melting ice, flooding, and drought. But feedback is another consequence, and it's every bit as bad as the original destruction, causing stored emissions to get released as global temperatures rise.

Some of feedback's mechanisms are well-known; like the stored carbon in trees from a forest fire or when a rainforest no longer gets enough rain and loses its vegetation. Some aren't so obvious; like the peat stored under permafrost in unfathomable quantities and crystalline methane stored under the once-frozen Arctic. Some even produce a double whammy of higher heating at the same time; like peat as it decomposes. But perhaps the worst is the melting of some Antarctic glacial ice. Most of its bedrock is above sea level, so ice melts very slowly and is mostly replaced by falling snow. But some of the bedrock is below sea level and its ice is melting much more rapidly due to feedback. If we don't stop it quickly, the ice will all melt, and sea level will rise an additional twenty-five feet over the next few hundred years, causing irreparable harm to our planet and most species, including humans.

As you can imagine, accurately measuring and modeling this feedback has been a monumental challenge and a top priority for years. But now it's done, and we know its true significance as global temperatures rise. Our current path puts feedback emissions at levels that can't be recovered from, which means ever-more melting ice, severe flooding, droughts, extreme storms, and heat waves without end.

This was unimaginable and couldn't stand, so last year President McGregor and I attended emergency global sessions and, along with every other world leader, signed a revised Paris Agreement. This one was binding and if met, would keep us from reaching feedback levels which couldn't be stabilized. Globally, we had to remove as much carbon from the atmosphere as we add by 2052. Then we needed to take out even more just a few years later.

"It's a huge task, but we're committed to being the world leader in taking carbon out of the atmosphere, just like we won the Space Race, Cold War, and became the world's greatest economy. So we're going to do even more. We're going to reach net zero by 2048 and increase our negative goal and get there years earlier too. Our department has worked all year to figure out how, and it's going to take all of your help again.

"Since our department began, our primary focus has been to reduce emissions, and because of your help, we've been successful. We need to keep those projects going to continue reducing emissions from transportation, fertilizer run off, heating with fossil fuels, and various industrial processes. But we need to add projects that remove and store carbon from the atmosphere. Tonight, I'm announcing two of these projects.

"The first is to make planting trees a national priority. To recognize the importance of trees for carbon capture, I'm asking Congress to establish Arbor Day as a national holiday for the last Friday in April. It's been over fifty years since the previous new national holiday was created, and there's no more fitting way to celebrate our country than by planting a tree, or better yet, a grove of them. Since the best time to plant varies by region, celebrate the day by planting, or making plans for when it is the proper time.

"We've been replacing trees lost to fire and encouraging new tree plantings around the home and in public spaces for years, but now we're taking it to a higher level. The added focus will be on unused or unfertile lands everywhere: public lands, pastures, homes, businesses, and land that isn't plowable. Our department has created special maps showing available land where trees can be planted so you can see where you can plant. But ranchers, businesses, and public servants will need help planting and caring for their new trees. So this is how you can help your country next; volunteer your time and energy. Make it a family outing, get your friends and co-workers to join in. Our centers will be coordinating sign-ups for these large plantings.

"Trees are a great way to capture carbon, but we also need to store what they capture. There are three things that happen when a tree dies: it gets turned into a product, it decomposes, or it gets burned. Turning it into paper, furniture, or lumber sequesters much of it, especially if the scraps also get used. When a tree decomposes, some of its carbon is stored in the soil with the rest going into the atmosphere. But if it's burned, all of it goes in the atmosphere plus soot from incomplete burning. These dark particulates can end up anywhere, some covering ice and snow, causing accelerated heating, or in people's lungs, causing health issues. So instead of burning, or even letting trees decompose naturally, we're going to sequester their carbon.

"Everyone's familiar with charcoal, which is mostly pure carbon made from organic materials by a process called pyrolysis. It keeps carbon from being released back into the atmosphere, during its manufacture. Biochar is a form of charcoal specially processed for amending soil. We're going to make it from tree waste and then use it to amend non-fertile soil to make it more fertile while sequestering the tree's carbon.

"The combination of planting trees and adding biochar to our soils will make our lands more fertile, stimulating all forms of plant life. These plants help remove even more carbon from the atmosphere and store more of it in the soil as it decomposes.

Here's another way you can help. We need your trees, branches and all. Don't burn them or even let them decompose. Turn them into black gold for the soil. We're going to set up collection areas at all our centers, and we're in discussions with municipalities and private refuse companies to pick up your tree waste just like they pick up your trash, leaves, and recyclables. We're also working with utility companies, road crews, logging companies, sawmills, and anyone else who cuts and trims trees for their scraps. We'll also be thinning out even more of our forest lands to help prevent wildfires.

"These projects will get us started down the path to meeting our commitments, and over the coming months, I'll be announcing the others. I'm relying on all of you, just as President McGregor did with the renewable energy project that was just completed, and I have complete confidence you'll come through again.

"The next guest I want to introduce won't be new to the people of the department but will to the home audience. He was the leader of the team that developed and worked out the details of the renewable energy project. His leadership, dedication, and skill helped initiate the plan and keep it on schedule through its many challenges. His skills are so recognized, he's again been chosen to lead our carbon capture projects. He's been working with his team all year to come up with projects like the two announced tonight to meet our pledge. It won't be easy, but he's proven time and again to be up to the task.

"He'll be accepting the Presidential Citizens Medal on behalf of the entire country for replacing fossil fuel power with renewable energy. It will be on traveling display all around the country in the months to come; you can see when it will be in your area on our website. After it travels the country, it'll be on permanent display in the Smithsonian for future generations to admire the contributions that you made to help protect our country's future.

"President McGregor and I also wanted to personally thank him for his passion, dedication, and service to our country. So we're presenting him with the Presidential Medal of Freedom. We both agree there is no more deserving person. Ladies and Gentlemen, Joe Johnson."

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Bev heard the president's words, but at first didn't understand their meaning. Once it dawned on her that Joe was not only accepting the country's medal but also personally receiving the nation's highest civilian award, her emotions took over. She didn't want to take away from Joe's moment, so she sat down and put her hands over her face and quietly shed tears of joy mixed with concern for his upcoming acceptance speech. Biyu quickly sat, offering comforting words.

"Joe will do great, you'll see," she whispered, instinctively knowing Bev's concern. Then after a few moments, she added, "But he'll want to see your face when he accepts the awards. He'll be emotional too, so it'll help to see that you're composed."

"I can't imagine how he'll make his speech now; he was already so nervous," she whispered.

It took a few more moments to compose herself, but then both Bev and Biyu stood with the rest of the crowd, smiling, clapping, and cheering.

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After my introduction, I stood mechanically without thinking. Even my mantra was forgotten. I kept my focus on the stage and just let my feet carry me to the podium where both presidents stood clapping. My daze only started to lift when I reached President Hawkins. *I have to make sure Bev is okay, was my first thought.* I quickly scanned the area where she was sitting and saw her beaming with joy and clapping enthusiastically. When she winked and gave me a thumbs up, I knew she was okay. It brought me back to reality, and I bowed my head to receive the Medal of Freedom.

Next, I accepted the Citizens Medal, shaking both presidents' hands while thanking them. Like so many athletes I'd seen after winning their event, I held the medal aloft for the crowd and cameras and waited for the cheering to subside. Finally remembering my mantra, I started speaking.

"President Hawkins, former President McGregor, family, friends, co-workers, and citizens all over the country, I humbly accept the Presidential Citizens Medal on your behalf. It's been my honor and great pleasure to serve as the leader of this project that brings our country closer to a more secure future. My work on this project has taken me all over the country: to both coasts for sea-based wind turbines and ocean power installations, to the great heartland for land based wind turbines and solar power farms, to town dumps and cattle ranches for methane capture, and into your homes and businesses to install solar panels. But wherever I went, there was one thing they all had in common: wonderful, caring people doing their best to combat our mutual enemy.

"Just as we did on renewable energy, I look forward with great anticipation to completing the carbon capture projects, which will finally give us the long-term security for future generations that we all long for. Just like the last time, it'll happen all over the country. In forests, we'll quickly replant burned out trees; in yards, businesses, deserts, and pastures we'll plant new ones; in the heartland, we'll improve soil fertility with stored carbon, and then we'll return to the oceans to plant sea grass, plankton, and kelp. Plus, you'll be hearing of some new methods, like today's biochar and other projects like mineral sequestration and direct air capture, which the president will explain at their announcements. Like the other projects, they'll be happening all over the country.

"Like the presidents who spoke so eloquently before me, I need to tell you how much we need your help again, perhaps even more than the last time. But with that help, I pledge to do everything in my power to accomplish our goal.

"When I was growing up, it was a family tradition to pass down my great-great-grandmother's stories from World War II— my mother to me and my brother, her mother to her, and so on. Four generations have done it, and when I have children, I'll do it too. My great-great-grandmother lost her only son who died during D-Day. It nearly broke her heart, and she was bedridden for weeks, unable to cope. But her family, friends, and others who had lost loved ones came together to comfort her and get her through it. When she finally recovered, she devoted her time to doing whatever she could to make a difference for the soldiers still serving. She started a victory garden, large enough not just to feed her family, but so there would be extras to give to the soldiers. She went to work in a factory making bomber parts. In the evenings, she volunteered at the local hospital, wrapping bandages for the wounded overseas. And on the weekends, she organized drives for scrap metal and rubber. Everywhere she went, she persuaded others to participate in her volunteer efforts. My mother told me about the joy my great-great-grandmother felt when someone's loved one returned home safely, but her profound sadness, knowing her son never would. But she always ended the talk with her great-grandmother's favorite memory from the war; the way people all over the country came together for a single purpose. People knew what needed to be done, and they just did it. It made her proud to be an American; that's how I feel right now."

After the applause, I walked off the stage and made my way to Bev. We hugged, kissed, and held hands as we watched the fireworks overhead. During the grand finale, she placed my hand on her stomach and whispered in my ear, "I wish our baby was in here, it'd be so proud."

Part 2

Chapter 16

Feb 22, 2042

I stepped out of the motel in Death Valley National Park to a beautiful morning. Unbelievable I thought. It was February, and the temperature a comfortable sixty-five degrees and expected to hit the high eighties by late afternoon. Scanning the area, I saw typical desert scenery: lots of dirt and rocks with a few shrubs, bits of grass, and cacti scattered throughout. But as I wandered the hotel's grounds, I began to see variety. The cacti weren't all the same, Cottontop Barrel was the most abundant, but there were plenty of Silver Cholla and Beavertail to keep them company. I'd done homework before my visit, trying to learn some of the more common species and was taken by their colorful names. I'd made a checklist with all the types to be found, and I took out a pencil and checked off my first three. Everyone had one, and we'd made a small wager to see who could find the most.

Next was the ground. Mounds, small sand hills, and depressions were so abundant that I had to pay attention to my steps and make sure I didn't stumble. Off in the distance, larger hills and valleys were visible.

Movement to my left, caught my eye and I saw a small brown and grey lizard scurrying under a nearby shrub. Then a monarch butterfly fluttering near a bunch of yellow wildflowers. We'd gotten in after dark last night, so the only scenery we saw along the way was that illuminated by our headlights. But in the clearness of the morning, the view was overwhelming to someone like me, not used to desert as far as the eye could see. I felt like an Apollo astronaut surveying the moon's landscape.

I was here with my core group of twelve, working on the desert project to get a first-hand look at what we were up against as well as helping collect needed samples. It was one thing to see desert video on a screen but something else to experience its reality. I needed the aromas, vistas, and dry, gritty taste in my mouth to really understand what we were up against. Plus the group needed a getaway from everything that had happened recently in DC. At the airport, we'd met up with Antonio and his group who'd flown in an hour later.

When we checked in last night, the hotel manager warmly greeted our large group and had a nice meal ready for us. He told us they didn't get many guests anymore, not since water had become so scarce it needed to be rationed. He hated telling us about the room's water being on timers: the shower, one minute a day; the toilet, two flushes; and the sink, twice a day for a minute. I guess you had to time your tooth brushing to your peeing. But he added, they had all the bottled water, soda, or coffee we wanted. Plus there was a beautiful clear pool, cool enough this time of year, even though it was full of salt water. He explained many of the aquifers were so low they now had high salt content, okay for a pool but not drinkable. There were some grumblings from the group, but I didn't care. I was going to enjoy the experience and hoped everyone else would too. We'd all earned a respite from the craziness.

The past several months had been nonstop. The president had stepped up his efforts to get the project approved and funded after Mexico signed on. But once the size and scope were fully realized, it seemed like there was a congressional hearing every week to prepare for. There were endless questions and requests for more studies. How far would we have to pipe the water? Where would the energy come from? How could we guarantee that endangered species wouldn't be harmed? It was the same story at the state and local levels and again when federal and state agencies got involved. Some of the land was on Native American reservations, meaning even more preparation and meetings. But in the end, it came down to pure need, as I'd concluded last year when I first proposed it. The bi-partisan coalition also concluded it needed to be done; there was no other way. The world had waited too long to deal with the issue by lesser means.

"Let's get to it," the agency heads and congress reiterated in the last of my hearings."

But they wanted report outs every step of the way. The politicians from the western states had questions from their constituents: about the desert from the trees being planted, concern for the coastline from the ocean energy plants, and for the brine produced from desalination. Members of congress not from the affected areas, had unending concern for the cost and damage to one of our national treasures. What helped seal the deal was the plan to exceed our targets and sell our emissions credits to other nations who fell short. This provided cover to those not in the climate coalition, who wanted to focus on the economics. Mexico sharing the cost burden didn't hurt the cause either.

States took longer to convince, and old-fashioned horse trading set in. Water and jobs were what they wanted, in that order. Without water, they couldn't handle the project with all the new workers. Creating jobs was the easy part; there would be many created by this project. Water was another story.

The long-term drought in the Southwest had drained most of the aquifers and groundwater sources were perennially low. In most of the desert portions of the states involved, California, Arizona, New Mexico, and Texas, water was now rationed and farming had gone the way of the dust bowl a century before, moving to more hospitable land. Gone were the days of desert irrigation with reservoir- or aquifer-fed water. Large reservoirs, like Lake Mead, Powell, and the Imperial dam still provided drinking water and irrigation for the more hospitable climates, but their levels were often low enough that rationing happened regularly. These states badly needed water in return for the use of their lands, so there was no choice but to figure out how to give it to them.

Modeling the rainfall changes due to the desert irrigation became the top priority. Our models confidently showed more precipitation would fall in the surrounding areas, helping to raise reservoir levels, but the studies had too much variation to know by how much. So we worked out a compromise to ensure there'd be enough water. We would increase desalination capacity by 25 percent over that needed for desert irrigation to provide for the added demand and help shore up reservoir levels so more water could be used for cash crops. But in return, we'd get part of the expected reservoir level rise to use for irrigation.

Native Americans were the last to give approval for their tribal land use. I flew out for several meetings to explain the details and projections. I think the sheer amount of data, number of studies, and past performance of the department helped sell them, allowing us to move forward. They wanted protection for their sacred lands and the right to lease some of the biodiesel refineries for jobs. We guaranteed their sacred lands in writing, submitting our irrigation and afforestation maps for their approval. They signed a lease agreement for a third of the refineries, with the stipulation they meet biodiesel quality requirements and keep the selling price no more than the average of the other refineries.

Finished surveying the immediate area, I headed back to the motel for breakfast and spotted Mason coming my way. He'd been recently named project supervisor, a lateral move from his previous position with the analytical group. His short, stubby body never seemed to fit his oversized work habits. Bev called him my long-lost brother, but his capacity for work far outpaced mine. He wasn't married and never talked about girlfriends, but seemed content living his life devoted to the job. Middle of the night emails or late-night office visits were not uncommon. Bev didn't think he seemed happy enough, so she'd tried to fix him up a few times, but nothing ever stuck, so she'd given up trying.

"What did you get me into?" Mason asked when he was near enough to be heard. "I shouldn't have let you talk me into coming. I was perfectly content with my virtual reality headset and drone video we have showing this same stuff. Plus I miss all the comforts of my office: a coffee machine, a comfortable chair, and a toilet whenever I need it. Let the technicians take the samples; that's what they're paid for. I can manage data better from there anyway."

"And miss this view?" I laughed, trying to lighten his mood. "Not to mention the weather is gorgeous compared to back home."

"A one-minute shower— are you shitting me? I'm going to use your flushes if I run out. And don't even get me started about a swimming pool with salt water."

"Are you done bellyaching? Get it out of your system now 'cause we need to set an example for the rest of the group. Help me out here."

"Now that I see it in person, I can't see how this project will work. I can't imagine piping enough water to make trees grow in this never-ending dry furnace."

"That's another reason I wanted the group out here, to see what we're up against. Simulations and video just can't do it justice. Not to mention most of us mere mortals are burnt out and needed a break. So get it all out of your system with me if you have to, but cut the negativity in front of the others. You ran the models yourself over and over again. Getting trees to grow is just logistics. Plus this desert has been used for growing many plants and trees, including ours over the years, just using aquifer water and not at this magnitude. Our hardest task is making sure the desert habitat isn't adversely affected, so let's stick with facts from now on, and keep your opinions to yourself."

"Ok, I think it's out mostly of my system. Must have been that short shower this morning. I'll stick with the game plan and try not to belly ache, at least out loud."

"I'm planning on having a great time, and you should too. I'm tired of nothing but analysis, meetings, and bad weather for months on end. I'm so ready to start this project; I can taste it." I replied and saw more of our group heading our way. "Let's go get some breakfast."

With his usual efficient manner, Mason handed out assignments after breakfast without his earlier complaints. He had placed us in groups of seven, each containing a park ranger and two technicians. Every group had a leader: Mason, Ava, and myself from the U.S., and Antonio, Ronaldo, and Isabella from Mexico. The park provided electric SUVs for each group with a biodiesel generator pulled behind for night charging and other power needs. There were also walkie-talkies for all since cell reception was almost non-existent. There were detailed maps of the sampling locations that had been selected to end each day near a campsite, ranger station, or motel for overnight accommodations. Everyone had packed three sets of clothes for our daytime work: long sleeve shirts and long pants made of lightweight materials to keep the sun off; brimmed hats were mandatory; and all were provided plenty of sunscreen, ChapStick, and drinking water.

Also among us was a group doing public education. They were spending time at each national park visitor site, giving prearranged talks on the project. The education group had flown out a few days ahead to do TV interviews in several western cities to discuss the project and promote the tour.

This was a few weeks after Presidents Hawkins and Fuentes had made a joint project announcement to the U.S. and Mexico. As politicians do, they focused primarily on the positive aspects, reiterating that the large carbon capture levels were needed to meet both countries' commitments, but they emphasized the economic benefits. Lots of jobs would be created for desalination, energy production, pumping plants, irrigation, soil excavation, and countless support items. And in a few years, even more jobs would be created from the production and sale of biodiesel from the seeds, industrial products from the brine, and biochar from pruning and replanting when the trees slowed their carbon removal. They explained the cost sharing and how they would sell projected credits to offset part of the costs.

Next, they assured the public the desert habitat would be preserved: the wildlife, vegetation, as well as protection of indigenous lands. They went into detail about the independent modeling each country had done to verify the projections, summarized the latest results from the India project, and mentioned the frequent report outs which would be publicly posted.

President Hawkins then asked the public for their help. "Visit the parks to verify we're doing what we told you. Help us do wildlife counts. Don't wait till the trees have all been planted, visit soon to help us add to our baseline. Then come back after the plantings and recount. If you don't like what you see, tell your congressman. Hold our feet to the fire and make us do it right."

Lastly, he announced the discussion tour at the national parks for people to ask questions, voice their concerns, and get details on how to report their sightings.

Each sampling group was provided detailed instructions specifying the type of samples and the measurements to take at each site. The technicians brought the necessary tools along with labelled bottles and boxes for the water, soil, and vegetation samples. We were all going to the first site so everyone would be on the same page, and then we'd head off in different directions for the rest of the week to finish each group's assignments. The group leaders planned nightly group discussions of the day's activities and to help resolve any issues.

While everyone was preparing to leave, my mind drifted to Bev. She was in the Marshall Islands, the latest step in her goal to place some of Oscar's orphans. She was with a couple doing a visitation, one of the last requirements before final approval. I was hoping once the adoption went through, she'd relax. We'd been trying to get her pregnant since last summer, but as each month's period came, she was getting more upset.

"What if there's something wrong and I can't conceive, like Maria's sister?" Was her latest musing.

I was hoping the stress of the adoption group was affecting her ability to conceive and when the first adoption was completed, pregnancy would soon follow.

Our first sampling site was about twenty miles north. We hadn't seen a soul or another vehicle since we left the hotel, and during the ride, the hills and vegetation seemed endless, obscuring both time and distance. The dry air had already dried out my nasal cavities, so I wasn't expecting any smell as I wandered over to the nearest Silver Cholla. Surprisingly, I came away with a slightly musty aroma. I also noticed my hearing was more pronounced. Without the urban background noise, I could hear a bee pollinating a nearby wildflower. Touching the cactus spine, my finger didn't have its usual sponginess, and getting pricked was much easier than usual.

"Watch out for the cacti," I yelled to the group, raising my bleeding finger as proof.

We stayed in a large group and went from task to task with Mason describing each sampling activity. First we would collect the water sample from the well, then the surrounding soil and vegetation with photography at each stop. Then we'd head off to the next well to repeat the process until the area was fully sampled. The wells and aquifers were well documented from previous periods when irrigation and selling to urban areas were common. The additional information we needed was the water depth at which there was too much mineral content for irrigation. We'd compare it to the current water level and calculate how much water we could extract. If there wasn't enough for the nearly four years of irrigation before desalinated water was available, we'd reject the area for our trial and look for another. Once irrigation began, we'd monitor the water level and quality, using these samples as the baseline.

The soil sampling especially intrigued me. Technicians used a graduated cylindrical tool to extract a six-inch diameter of soil for a depth of eight foot, using a pneumatic hammer for driving and a winch for removal. With the soil still in the tool, moisture readings were taken every few inches. The dirt was then transferred to a shipping crate, using forms that kept them in their original orientation, and then the samples were marked and sealed for later lab testing. Samples were taken every hundred yards for a half mile in both directions to form a square grid.

We photographed and labelled the vegetation within the grid so it could be overlaid later and matched to the soil measurements. Then we sampled it by taking cuttings from representative plants. Several of the team set out in different directions to mount poles and solar panels for audio and video equipment that would record wildlife sightings. Since the group was so large, we finished the first site in just a few hours. Afterward, we ate lunch discussing what we'd seen, and then we broke up into our prearranged groups and headed to each of our next sampling sites.

I was fascinated by the experience. During the drives from site to site, I found myself constantly looking out the window, searching for signs of desert life. Throughout the week we drove from sunup to sundown and everything in between, so I saw both diurnal and nocturnal animals, especially the larger ones: coyote, bobcat, mule deer, bighorn sheep, pronghorn antelope, jackrabbit, Gila monster and chuckwalla lizards, roadrunner, and to my great surprise, a few tortoises. At the worksites, I concentrated on birds as they flew overhead and smaller animals I couldn't see from the car: hummingbirds, owls, woodpeckers, hawks, butterflies, and golden eagles were common. Kangaroo rats, snakes of all size and color, and small lizards were so plentiful, I had trouble keeping up with the sampling. Keeping the ranger near at hand, we ended the week with the most comprehensive species listing.

The flora didn't have quite the same draw as the wildlife, but wildflowers, blooming shrubs, and large cacti drew regular oohs and aahs. Since we were already photographing and sampling the vegetation, I concentrated on the unique. Hillsides and higher elevations were the best to find different species from those on the flatlands. Antonio turned out to be the biggest cactus fanatic, as his group won the week's friendly competition with forty-three varieties. Isabella's won the wildflower category with fifty-eight. But no one came close to our group's wildlife count, numbering more than a hundred.

In the evenings after our teleconference, I took long solitary walks, basking in the quiet moonlight. I'd stop and sit for long periods to stare at the heavens then continue walking, listening to the sounds of the night animals. I could feel the stress fleeing my body.

On Thursday night, I walked longer than usual before heading back to camp. Pulling out my compass, I began heading in the direction I thought I'd come, but after walking for an hour, I began questioning my memory. Maybe I misremembered and should have headed south instead of west. With my flashlight getting weaker by the minute, I spoke into the walkie-talkie.

"Are you okay?" Mason answered, "You've been gone longer than usual."

"I might be lost."

"Aren't you using your compass?"

"Yeah, but I should have been back by now. How about you hop in the SUV and head due east, honking the horn. I'll let you know when I hear or see your lights. If I don't after a few minutes, I'm north of you and screwed up."

They all had a big laugh at my expense when I finally made it back, but I didn't care, I'd had a good time while lost, my first real adventure since childhood.

With Mason's preparation, things went smoothly considering there were nearly fifty of us in the desert for a week. There were some busted tools, dead batteries, flat tires, and the like, but nothing that couldn't be dealt with. Cuts, splinters, sprained ankles, and sunburn were the worst of our injuries. We shipped our samples out to labs with results expected a few weeks after returning to the office. But one thing happened that I hadn't expected— I fell in love with the place. The landscape, wildlife, and serenity I'd experienced day after day took my breath away. I couldn't wait to do it all over again in Mexico but couldn't help wondering how I would fare once back home, where nothing remotely resembled this place.

Chapter 17

During the several long flights to the Majuro atoll, I had plenty of time to talk, sleep, read, and watch movies, but most of all I just thought. My most obvious thought was about how far we'd come on our group's adoption journey. With Amy's help, we'd successfully kicked off our adoption awareness meetings, and interest had grown steadily. With much help from Oscar, we'd researched the required forms, background checks, and visitations so we'd be helpful every step of the way. Oscar had given us the contact info for an immigrant couple from the Islands living in Virginia with their adopted son, Maru, who shared their experiences at one of our meetings. As Oscar predicted, the video calls with the children telling their stories were always the biggest attraction. Their innocent faces and gentle natures combined with their harrowing words melt the hardest of hearts.

The Simpson's expressed interest right away and started the process soon after seeing Dilini on a video call. John worked in the department and his wife, Evelyn, taught elementary school. They visited Maru and his new family several times, learning the culture and the pitfalls inherent with bringing such change to a young child. This trip was their pre-adoption visit to meet the eight-year-old girl who had won their hearts. Several other couples had also expressed interest, and I was praying many would soon follow. Plus, I couldn't wait to see Oscar in person again; it had been years, but we'd become close friends with our recent chatting. He truly had a proverbial heart of gold and did everything and more for his kids.

Then my thoughts drifted to our biochar study. Just last week we finished the analysis on the fall harvest, and the results were even more successful than the earlier studies. Amy said it was because of the tweaks we made from our previous trial learnings. Across the board, everything looked good: every crop, weather condition, soil type, and farming practice. Our group was pleased, but nothing compared to Cal, who was ecstatic and nearly ran back to Joe's office to give him the good news.

"It took him a full minute to calm down enough to explain the results," Joe told me that night at dinner. "I thought he was having a seizure. He was happiest about the agriculture benefits: drought resistance, higher yields, erosion resistance, and nutrient usage, but I was more excited about the pasture trials we added last year. Augmenting part of the field with biochar, then planting seed is already looking promising. I can't wait till the spring results to see how well the grass comes back and compare it to the untreated parts. I expect we'll see even higher carbon capture levels than the fall results."

Then my thoughts went to Rita and Lucas and their destination wedding in Jamaica. Joe and I went over the holidays and extended the trip to a full week of relaxation in the sun. Their announcement had been sudden, only a few weeks' notice, but now I knew why; she was pregnant. They'd had us over for dinner a few weeks ago, and when they told us the July due date, it didn't take a math whiz to figure it out. I asked her later, when we were alone, if she truly wanted to marry him or if she was just doing it because of the baby.

"I'm was pretty sure I loved him, but he's been so excited about becoming a father, I knew he was the one. You should see him when we go shopping for baby stuff; you'd think he was a little boy at Christmas."

"Why'd you wait so long to tell us?"

"I couldn't hide it any longer, but I hated telling you knowing how upset you've been by not getting pregnant." Rita said, giving me a hug.

"I'm truly happy for you. Ours will come in due time; I'm sure of it."

This of course led to thinking about my difficulty in getting pregnant. It'd been nearly eight months since we started trying and we'd been quite diligent in our efforts. The first few months didn't bother me, but by the fifth, I began getting anxious as my period approached. Then after my period came, it was a huge disappointment, and I'd be blue for days. Joe went out of his way to cheer me up: fixing my favorite snacks, planning a getaway weekend, or just holding me during a chick flick. We hoped my emotions from the adoption group were part of the problem and with the first one nearing completion, would help the pregnancy happen. I had to admit the emotional roller coaster of joy when the Simpson's announced their decision, to despair when I got last month's period couldn't be good for anything, much less a pregnancy. But after this month's period, it got worse. My mind went to Vanessa, Maria's sister, who couldn't get pregnant either. What if I had cancer too? I cried for days until Joe made me set up an appointment with my OB to get checked out. My appointment was the week after I returned and I was relying on this trip to help take my mind off it.

With traveling taking more than two days, the time difference, and so much idle time for thinking, I was quite groggy and emotionally spent when I finally saw the airstrip as we approached for landing. It was nothing like I'd ever seen before and brought me out of my stupor. The strip took most of the narrow part of the atoll, just a few feet of grass on either side then the ocean. I bet aircraft carriers weren't much narrower than this. But at least it looked long enough. Thankfully, the landing went okay and we were out of the plane before I knew it. It was a small airport, so as soon as I got to the bottom of the stairs I could see Oscar waving from an open window. His red hair gave him away in the states, but here it was as if he were a space alien. When I saw several waving kids surrounding him, I couldn't help but break into a smile and wave enthusiastically back. Any of my remaining grouchiness melted away as soon as John and Evelyn reached Dilini and hugged her tight. There were tears of joy from everyone, even a few of the airport staff. As I hugged Oscar, he whispered, "thank you."

On the drive to the orphanage, Dilini told us all about the sights. Like all of Oscar's orphans, she spoke both English and Marshallese, and in her excitement, her words kept going back and forth between the two. Her happiness was infectious, but I couldn't help but be affected by the island's devastation. Washed-out and destroyed remnants of homes, shops, and boats were visible everywhere. Reading statistics about it was one thing, but seeing the island just a few feet above sea level and realizing it was sinking lower every year, brought it to reality. It was easy to imagine waves from even a normal-sized storm flooding much of the island, destroying infrastructure, crops, and polluting their drinking water. Knowing two typhoons had hit the islands in the past few years, I was seeing their ghastly effects.

On the drive, I sat next to two small siblings, Langidrik and Bujen. Langidrik told me his name meant "small storm" in Marshallese. He was five and would be starting school later that year. He could already read, he told me proudly, and he loved to sit at the table when the older kids did their homework. He said his sister's name meant "promise".

“She’s just three, and too shy to talk to most adults except the islanders who come to help,” he said with an accent I’d later hear from most islanders.

Bujen stared out the window without expression while her brother talked. When he told me about their mom and dad dying in the latest typhoon while trying to save their fishing boat, I saw tears rolling down her cheek but heard not a sound. My heart ached to see her sadness, so I reached out, and she let me hold her hand the rest of the way.

As we drove, the island’s geography became apparent. I knew the island was just a narrow coral strip running for less than fifty miles in a shape which reminded me of Tennessee’s, but seeing both coasts whenever palm trees and buildings allowed, showed how truly narrow it was. Raising buildings seemed the only protection from flooding; there was just no high ground. When we arrived at the orphanage, Oscar gave a tour.

“FEMA got us set up with a proper roof, gutters, and these rain barrels so we’d have backup water. Did Joe ever tell you how much he helped with getting our supplies?”

“We were going through a rough patch at the time and weren’t talking much. Later, all he described were the hardships your kids have to deal with.”

“He made sure we had everything we needed. I never thought it possible for the government to act so fast. On my flight back was a truck load of food, clothing, and bedding that he magically got loaded in time. And the week after I returned, the supplies and the tools to rebuild were delivered. Several islanders, with the help of FEMA contractors, finished construction in a week. It was more than we had before the storm: a refrigerator, stove, kitchen supplies, and even a microwave, along with a washer and a dryer, and enough detergent for months. And my favorite, an extra-large bathroom with enough shower heads, sinks, and stools for several at a time. It was next to impossible, trying to keep all the kids clean with just one of each. I called him right away and thanked him profusely, but he said he was just grateful it all had arrived. A few weeks later he called to say you were back together, and I nearly wept with joy.”

We climbed the few stairs and went in the door. There were two islanders inside, who Oscar introduced as a neighbor couple, Moana and

Rangi, who helped clean and fix a snack for the older kids when they got home from school. I could see how sparsely the orphanage was furnished, with cots along the perimeter, a dining table that doubled as a desk for homework in the center, and a small kitchen area to one side. But the shelter was neater than I expected, knowing fifty children lived here. The floor was swept, with no food or clothes visible, and cots were made.

It was lunchtime, so we all pitched in to fix peanut butter sandwiches and veggies with milk to drink. While we ate, Oscar told us about their typical day. Everyone over five went to a nearby school, which was why no one else was here when we arrived. There was a group of locals, like Moana and Rangi, who alternated staying with the young kids, fixing breakfast, and getting the older ones off to school. After school, the kids had a snack, worked on homework, then played outside. On the weekends, the older ones went out with fishermen or did odd jobs to earn money and help get a start for when they graduated.

Afterward, Oscar gave the Simpson's a rundown on what needed to be done on their visitation. The interviews and forms would take a few days, but he would shepherd them through the process. He'd become an expert at it.

"What can I do for the children?" I asked when he finished.

"Just being here with the preschoolers and showing you care goes a long way. Helping with their chores, reading to them, and playing games does more than you'll ever know. For the older ones, cooking some favorite recipes, helping with homework, and telling stories about what life's like in the states would be great."

Which is just what I did. Oscar and I went to the outdoor markets that afternoon and stuffed the car full of food to fix everything I could think of. There were several unknown fruits and veggies, but I figured they'd work fine as substitutes in my standard recipes. The fresh fish selection was so marvelous, I salivated thinking about how good it would taste freshly grilled.

Once the older kids got back from school, several helped make the afternoon snack then later cut up and fried breadfruit fritters while I made rice to go with the fish that Oscar grilled. Ice cream sundaes were a huge hit for dessert. I held a reading session for the young ones, who enjoyed it so much they asked Oscar if they could extend bedtime to hear more. I was overjoyed when Bujen crawled onto my lap when I began the second book. Once tucked in, I made hot chocolate for the older ones and told them stories of life in America.

The next day I spent with the Simpsons meeting with adoption officials. Oscar knew everyone we met and kept the process moving forward quicker than I dreamed possible. By the end of the afternoon they had filled out lots of forms, been interviewed by several different people, and were told to come back in a few days with Dilini for follow-up. School was out by the time we returned, and several of the older kids asked me to join them snorkeling. Walking along the sand to our destination, I noticed the wrecked boats, flooded out homes, and other ruins. The kids seemed not to notice, but I couldn't help but realize, I was seeing the story of some of their families' destruction.

For dinner, the older kids peeled taro and cut up carrots and cabbage for a fish-based stew while I made one of my grandma's favorite recipes, bread pudding, for dessert. The young ones pleaded for bedtime reading again, with Bujen climbing onto my lap from the start. Falling asleep before I finished, I lay her on the cot, covered her with a blanket, and instinctively kissed her forehead. Langidrik asked me to tuck him in, so I repeated the process, putting him in the cot next to hers. My heart seemed to grow, watching them sleep, and I fell asleep with them in my thoughts.

The following days were full of activity. Getting the school kids breakfast and off on their way, feeding the small ones, and seeing John and Evelyn off to school with Dilini kept me busy. Oscar had phone calls, paperwork, and meetings to attend to. I stayed active with the young ones and regularly took them to the water; they seemed drawn to it. Playing on the beach, swimming, or fishing, it mattered not, just as long as the water was nearby. The locals would stop by and chat, handing them a treat or taking them on their boat to see their day's catch.

I also got to know the helpers. Oscar had always said how terrific they were and without their help, the kids wouldn't have made it, and now I could see why. One day we did the washing, the next we cleaned house, chatting all the while entertaining me with their history, traditions, and culture. The first day after the work was done, they showed the kids and me how to hand weave a jainai, a mat made of coconut fronds. The next day, one of the women taught the kids a traditional dance while I talked with a married couple, Malem and Tulpe, who told me about the “tomb”.

“It’s in the Enewetak Atoll, about a thousand kilometers from here. This massive slab of concrete covering up the radioactive material left after all the nuclear explosions. It’s always leaked radiation, but is getting progressively worse, the higher the seas rise,” Malem began.

“Why is it leaking?”

“The atoll bedrock where it’s buried is porous, so water can get in. When the water comes back out, it’s radioactive, and the current takes it back out to sea. Fishing is banned for many kilometers around it, and the restricted area grows every year.”

“It’s poisoned all the islands,” Tulpe interjected. “They say the levels are still low enough to live here safely, but families like ours with sickness know better.”

“Who’s sick in your family?”

“Our granddaughter, Yoana, has leukemia. She’s just nine.”

“I’m so sorry, how’s she doing?”

“She went on chemo, and it made her so sick she almost died, but she’s in remission now.”

“Thank God, I hope she stays well.”

I asked Oscar about the “tomb” that evening after the kids were in bed.

“It’s such a tragedy and another reason why so many have left the islands.”

“But can’t something be done to stop the leakage?”

“They’ve had experts out to investigate, who say it’s very involved and expensive. The nation is so small, they don’t have the equipment nor the money.”

“Why doesn’t our country? We’re the ones who exploded the bombs that created all the radioactive waste.”

“The Marshallese have requested that for decades, but they don’t get taken seriously enough. I think it’s just too far away to think about.”

The day arrived to complete the remaining interviews and finish the visitation. That night there was a celebration meal to bid us farewell. Afterward, singing and dancing followed by cake and ice-cream. John and

Evelyn explained to Dilini that it would take several more weeks to get everything approved, and then they'd be back to pick her up for good. Until then, they'd keep video chatting. The next day there were hugs and a few tears when we said our good-byes. Bujen held my hug the longest, and I cherished the moment.

Chapter 18

Bev had my favorite dinner ready the night I got back from the desert: salmon, brown rice with asparagus, and a glass of Sauvignon Blanc. She was so excited to tell me about her trip and the kids— I couldn't help but smile as I listened. *And I thought my trip was exciting*.

"The look on Dilini's face when she met John and Evelyn made every meeting, form, and interview worth it. She's the sweetest thing you could hope for, and they formed a genuine bond in the short time they were there. I think they're going to be great together."

"How long will it take before they can bring her back?"

"The officials told us all the prep work had paid off. The Simpson's had learned so much about their culture, and having Dilini get to know them ahead of time was a huge benefit. She spoke so well of them in her private interviews, it sealed their case. It should just be a few weeks to get all the paperwork in order. I can't wait to tell all the others; it should encourage others to follow suit. I hope there's a domino effect."

"Me too. What about Oscar? How's he doing?

"He's amazing. He's the glue who holds it all together. Can you imagine being responsible for fifty kids and still find time to get them parents? He deserves a medal. By the way, he told me about what you did to help rebuild the orphanage and I fell in love with you all over again," I reached over to give him a lingering kiss. "But I heard some disturbing news too."

"What?"

"Did you know there was leaking radiation from nuclear waste left after all the explosions there? They buried it in porous rock, and with the rising seas and frequent storms, contamination is leaking out in rising amounts. One of Oscar's helpers has a granddaughter with leukemia they think is caused by eating fish caught nearby. Oscar says they can fix it, but it's too expensive for the Marshallese, and we aren't willing to help."

"That's news to me; let me see what I can find out."

"Fair enough, now tell me about your desert trip. Were you miserable?"

“Just the opposite, I loved every minute: getting my hands dirty, long drives, and being worn out at the end of the day but still wandering around at night to explore more. Just seeing stars so bright and clear made me want to stay up all night to watch their show.”

“Wow. You should write a book about your adventures; call it “Insanity”. I bet you’d be singing a different tune if it was the middle of the summer and 120 in the shade.”

“I’m serious; it was terrific. I was sorry to have it end and come back to endless concrete, crowds, and traffic. I felt things that I’ve never experienced; it was as if my every sense was in overdrive: the earthy smell of the soil and the softness of the sounds. It took me a while to recognize the sounds; it’s so quiet at first. But once you get used to it, you can hear a snake hiss and the movement of the brush when a lizard scurries for cover.”

“I understand. Sometimes the city gets to me too. Makes me wonder if we’ve paid too high a price for our basic needs.”

“Next time come with me, you’ll fall in love with it too.”

“Ok, it’s a date, but now you’ve a job to do. I feel way more relaxed meeting Dilini and knowing it’s only a matter of time till her adoption is finalized,” Bev said, reaching for my hand. I grabbed the wine in my other and headed to the bedroom hoping to prevent a repeat of last month’s anguish.

The following evening we watched as the president made the next two carbon capture announcements, both using the ocean’s expanse for carbon capture. The first project was expanding kelp forests. Searching for potential uses, Gabriel and his team’s research led them to organic fertilizers, biofuel, and cattle-feed supplements. Widely used as a fertilizer for centuries, the president discussed recent studies that had shown even higher amounts led to further benefits, especially in nutrient-depleted soils. When combined with other soil additives like manure, compost, and biochar, irrigated fields had been able to reduce water usage, and nonirrigated fields saw improved yields, especially in drier years.

Next, he talked about kelp biofuel, beginning with its processing. It was made with a thermochemical liquefaction process that dried it, took away the impurities, and then turned it to oil under high temperature and pressure. “It’s economical when produced in high enough quantities,” he concluded. “So we’re adding it to the list of biomass feedstocks available for federal subsidies.”

Next, he discussed its use as a cattle feed supplement.

“Finding ways to reduce methane release when cattle belch have been ongoing since the beginning of the department,” he began. “Anecdotal evidence pointed to certain kelp varieties as beneficial, so the department did scientific studies, culminating with large trials on various cattle breeds that verified significant reductions.”

“To help sell it, the FDA will be coming out with labelling to show that a beef or dairy product came from cattle fed with kelp added to their diet. So ask for it at your favorite supermarket, fast food chain, and restaurant,” he concluded.

The second project that he announced was to increase phytoplankton levels. Using footage from a design that Suzette’s team had come up with to dredge the ocean bottom for its nutrients, buoys were shown bobbing up and down in the waves. Attached to submerged structures, this motion-generated energy drove a pump, circulating the nutrients from the sea bottom to the structure, accelerating phytoplankton growth.

“Trials have shown significant increases in marine life around the structures, consuming the phytoplankton. It’s been so successful,” he announced, “that they’re already being produced by the thousands for fisheries, hungry for their results to catch and sell. So make the ultimate sacrifice and continue your affinity for consuming delicious seafood,” he deadpanned in conclusion.

The following afternoon, Bev had her appointment with her ob-gyn. I offered to come along, but she said it was something she could handle.

“How did it go?” I asked when she got home.

“The physical went fine, nothing abnormal. But she won’t know for sure till the lab work comes back. I’d like you to come with me for the follow up in a few weeks.”

Since returning from the desert, our group had worked out many of the trial details. Things had started out fine, but as they progressed, it became the worst stretch of my career. We began by doing calculations using our samplings. First we looked at the water to find wells with high enough quality to last until desalination took over. This allowed us to finalize the trial sites. Next, we examined soil nutrients to decide augmentation details. Then we created a database to house all the wildlife, vegetation, and soil grid readings to serve as a baseline. Ongoing data would be compared to these to determine future impacts to the desert environment.

But then things got more complicated. The primary goal of our trial was to determine the best Jatropha curcas hybrid to use in our desert environment. Jatropha was a prolific plant with over 170 separate species, with the curcas being just one. Since this variety produced useable oil, it was used and hybridized by many nations over the years to optimize oil production, but India was the first to hybridize it for both oil production and carbon capture. Since our soil, climate, and geography were different from theirs, we needed to develop our own hybrid to best balance them. After studying the traits of each curcas variety from around the world, we selected twelve, then hybridized them with each other for our final trial size of 132 varieties.

For efficient irrigation, we divided most areas into hundred-acre square sections where geography and land use agreements allowed. Mountain sides, creeks, populated areas, and off-limit locations often required unique plot sizes. A forested hundred-acre plot would be surrounded by other large areas left as original desert habitat. In the forested section, planted rows would be spaced a dozen feet apart with service roads for maintenance work and irrigation machinery. Within each row, the Jatropha would be planted close enough to essentially form a single bush when mature.

As we did calculations, the magnitude of the project hit me squarely in the face. More than a half million trees for each variety and this just one of the 140 million acres on the U.S. side. I'd done the preliminary calculations, so the magnitude wasn't really a surprise, but before it had only been a study— one that I never fully envisioned the president or congress signing up for once they heard its details. I relived my recent visit there and wondered what all these trees would do to the feeling I'd had, and I got mad, nearly irate. Like everyone, I'd been pissed at work before, at co-workers, the bureaucracy, or when something went really wrong, but this was different. This was deeply personal, and I couldn't shake it.

I knew the next step was to get the hybrids started so they'd be ready for planting. We'd developed a comprehensive instruction sheet for hybridization, which would take months of careful attention by thousands of nurseries to prepare them, but out of anger, I resisted. When Mason stopped by to get the approval, I told him to hold off, then snapped at him when he asked why. I went out for a walk to cool down, but when I got back, I didn't act; I just ignored him and the contracts.

When we started working on irrigation details, it initially calmed me. Since our trial acreage would be irrigated with aquifer water, there were only limited ditches and piping needed to bring the water to flexible hoses that ultimately connected to the equipment that would do the final watering. We designed the system so the water source could be switched over to the desalination piping once it was available.

Our modeling showed that variable irrigation throughout the hundred-acre plot was critical to maintaining the adjacent desert habitat. The middle of the plot would get the most water, and then it would gradually taper to no irrigation at the ends. We'd already designed and ordered the linear move irrigation equipment, knowing how long it would take to manufacture the quantity we'd need.

The machines were mechanical wonders. They connected to the supply line at one end of each plot, then moved down the side, watering as they went. The arm was long enough to do the hundred-acre width in four passes, using the wide service roads. Irrigation was done by varying several things: machine speed along the row, faster for low amounts, slower for more; nozzle quantity and orifice size along the arm, several large openings for highest amounts down to a single small nozzle for lowest; and lastly, line pressure changed by adjusting pump speed. Using GPS, we'd know precisely where the machine was and change the pump speed accordingly. The arm was hydraulically powered to raise as the trees grew, but the nozzles for each row would be lowered to near ground level to reduce evaporation during watering.

Each machine could irrigate ten plots a day, allowing enough time to connect and disconnect the supply line at each side and travel between plots. For the peak irrigation periods during the summer, we'd need to irrigate each plot weekly, meaning for our million-acre trial, we'd need more than fifty of these machines, including backups for breakdowns.

Because of the long lead time, once we completed the trial irrigation design, we started designing the system to run water from the two desalination plants, the Mexican one in the northern Gulf of California and the U.S. in Southern California. Our initial design started from where the two would meet, just over the border from the Gulf. The basic layout was straight-forward. Several large supply lines would take irrigation water to the desert's western edge. There they would connect to intermediate pipes running every direction through the desert lands. These would connect to feeder pipes in each specific area to irrigate and ultimately end at the flexible hose attached to the irrigation machine.

There were already dozens of buried pipelines from the desert's long irrigation history, which we took advantage of to reduce the number of new ones. Some took aquifer water to other parts of the desert, others to urban areas. This was big business decades ago as drought regularly plagued western states and desalination was still prohibitively expensive.

To get the high flow needed over such a long distance, we used six foot diameter pipe for the main lines, each with a capacity of fifty million gallons a day. But even at this high flow, several would be required to irrigate the many millions of acres. The trenches needed to be wide enough to lay them all and deep enough to be below the freeze line. Each pipe would be equipped with regularly spaced shutoff valves and sensors to aid in diagnosing and minimizing leaks. Even with reusing existing lines, this was a monumental effort. I tried to console myself that, at least once it was done, they'd be there for the foreseeable future.

Once the supply lines got the water to the desert, they would attach to intermediate lines through manifolds along with a half-million-gallon water tower to serve as backup during a shutdown or other emergency. Each supply pipeline fed several smaller intermediate pipes, sized to take their proper share to its designated area. Once there, they fed into feeder pipes through more manifolds. Daily, each feeder pipe would supply the amount of water needed for a thousand acres of irrigation. This pipe housed the variable pump and connected to the aboveground hoses, which in turn connected to the irrigation equipment. Pressure and flow gauges connected to shutoffs that were spaced liberally throughout the system to ensure proper operation, with redundancy in critical areas to maximize uptime. We had designed small solar farms to be near each pumping station to provide its power.

Throughout the days of reviewing the team's calculations, I felt irritation just below the surface. But as the totals for mileage started piling up, anger rose over the top. The amount of ditching to be dug and pipeline laid all over the desert felt like an atrocity. When we added the solar farms, water towers, and pumping station monstrosities, my anger bubbled to new levels. This time I put a word to my anger, condemnation. Those sons of bitches. What right did they have to cause this aberration? I started yelling at my group even though my brain knew they weren't to blame. I needed to get away. This time a short walk wasn't enough, so I boarded the train and rode to the last stop. I didn't even know which direction I was headed until I saw a sign for Landover. I wandered around, stopped for a coffee, then texted Mason to say I wouldn't be back today. Then I sent one to Bev to tell her she'd be riding home alone.

"What's the matter?" she asked as soon as she got the text and called back.

"I'm just mad at the world and can't deal with being civil right now."

"Why so mad?"

"We finished more desert calculations. Every time I see the ridiculousness of this project, it makes me go berserk. We shouldn't have to do this; it's just wrong. Do you know what we figured out today? The thousands of miles of pipeline that will go through my beloved desert. Not to mention the thousands of miles of supply lines bringing them water. Guess what that's going to do to my desert? Bat-shit crazy stuff, that's what. Makes my blood boil. And you know the person I'm most mad at? Myself. I'm the one who thought up the fucking idea of making part of the desert a forest. It's like the old comedy line, "thought it was a good idea at the time." Ha-ha, but the joke's on me. If I'd have been apathetic like all the generations before, with their "it can't be all that bad" and "what can I do" attitude, this wouldn't be happening."

"I've never heard you like this, you're scaring me. You need to get away from it. Let Mason and the rest of the group handle it now. You've laid the ground work; they can finish. Don’t do anything stupid. Just go home—I’m heading there now.”

Chapter 19

“Thanks for coming tonight, I really needed to get away for a while,” I said to Fran, Robin, and Maria as we sipped frozen margaritas.

“None of us had heard anything from you in weeks and were getting worried,” Fran said. “You weren’t answering texts or calls. I was so relieved when you posted to meet here tonight. I wouldn’t have missed it for anything.”

“I just had too much on my plate to think about anything else. I didn’t mean to worry anyone.”

“So tell us what’s going on,” everyone said at once.

“Well, Joe went through a rough patch from stress at work, but he’s getting better. It all started with his trip to the desert while I was in the Marshall Islands. He fell in love with what he experienced. The peacefulness and serenity of the surroundings was such a contrast to the unceasing pace he’s been living for decades. When he experienced it so fully, he didn’t want to give it up. Worst of all, he blamed himself as the one responsible for trying to destroy it. It came out in the form of anger. Originally against everyone else, but after a while, mostly himself.”

“Did he get counseling?” Maria asked.

“No, he wouldn’t even try it. Said it was something he had to work out for himself. Same old Joe there. Antonio, his counterpart in Mexico, found the solution. They went back together to the desert, rented an RV and drove all around hiking, sitting around the campfire at night, and just talking. Initially about small stuff: the animals they’d seen that day, the colors of the wildflowers, and which constellations they could make out. Gradually, Antonio reminded him which parts had been farmed over the decades. A few days later, mentioning the models that both countries’ had run showing the minimal impact it would have on the desert. The wildlife and wildflowers would still be there. The stars would still be as bright, maybe even brighter. But most of all, the serenity would still be there. There would just be trees, lots of them.”

“How long were they there?” Fran asked.

“Two weeks. Right in the middle of all the project’s planning. I’d see Mason at work, and he was going ape-shit working sixteen hour days, sleeping on a couch in the break room. He was talking regularly with Antonio's group, and it was the same down there. Antonio was also their spearhead, so with him gone, his people were running around in circles too. They both seem to have that uncanny ability to clearly see things in their minds that are foggy to everyone else. Finally, Joe's boss told the group to take a week off, and go home so they'd be fresh when he got back."

"So he's back at work now?"

"He went in for several days to help get things organized but left again this morning for the Marshall Islands. He went with the couple who are doing our first adoption and three other couples making their visitation. As part of his self-therapy, he started coming to our meetings and has really gotten involved. He began speaking at functions to raise awareness— his presidential medal gets him into about any organization, radio talk show, or local TV broadcast that wants a human-interest story. Our group attendance has already doubled, and his calendar is booked for months with upcoming engagements. We may have to find a larger venue for our meetings."

"My sister Vanessa and her husband are interested in coming to one of your meetings," Maria said. "They've started thinking about adopting, so I showed them your website. I'm hoping it helps their marriage; they haven't been the same since her surgery.

Robin had big news and announced she was now engaged to Phil. "We don't have a date yet, but we're planning a justice of the peace wedding in the Caribbean. We just need to decide which island then book it. We'll have a reception dinner for everyone when we get back."

"I've got one more piece of news," I added after everyone toasted Robin's news. "The results came back from my testing, and everything is normal."

After they congratulated me, I asked Fran if she wanted to spend a few nights at my house since I didn't like being alone when Joe was away. After stopping by her place to get her things, we talked more about our on-going pregnancy issues.

"My period's due next week. If it comes, Joe said he'd get medically checked out."

"Is he worried about it?"

“Yeah, but deep down, I worry that’s part of his anger. You should have seen him at his worst; it was scary. He’s always been so in control of his emotions, I sometimes wondered if he was human. But he was pacing, cursing, and weeping for days on end. I can’t believe it was just stress from work. And now he’s gotten so involved with adoptions for other people, I think it may be connected.”

“Well you know how some men can be, maybe that male ego is having a hard time accepting the possibility of infertility.”

“His ego’s never been an issue. We’ll just have to wait and see.”

When Joe returned from the Marshall Islands, he seemed back to his old self. He brought me up to date on Oscar, how it went for the Simpsons bringing Dilini home, and the other couples making their visits.

“I see what you mean about their precarious existence. The water almost laps at their doors. But the kids still enjoy playing in it, and I don’t think they realize the long term implications.”

“Not many kids do and I often wonder about the adults.”

“While I was there, I checked into the “tomb”. Oscar arranged a helicopter fly-over during high tide, the water nearly reached the rim. Then I got to see the latest radiation readings at various atolls, including Majuro and Enewetak. The Enewetak readings are high enough that fish would become contaminated if they were there long enough. Since the coral is dying out, the islanders now have to travel further to catch fish, and maybe they’re catching some contaminated ones. The area’s incidence of cancers is abnormally high. I’m not an expert, so I want to get all this data to the NRC for their review.”

“If they confirm the radiation leakage, what can be done?”

“The experts told Oscar that they’d drill a series of holes through the concrete and force stainless steel pipes down deep then pressurize them with a molten ceramic material that would harden as it adhered to the bedrock. But it requires many holes and multiple passes over the same area to build it up thick enough to withstand degradation from the ocean water over time. Plus it all has to be done with radiation-proof gear worn by the operators. Once that’s done, they’ll add additional thickness to the concrete to keep the rising oceans at bay.

"I had another thought while I was there," Joe continued. "I've decided to stop my day-to-day work on the desert project so I don't drive myself crazy again. When I went back for those few days to straighten out the mess, I realized I couldn't do it anymore. I thought Mason would handle it better, but his strength is analysis, not project management."

"Won't it be hard to find someone with the background to do that job?"

"The most important asset is they be a first-class organizer. Mason knew the stuff like the back of his hand but still failed. There are enough people that know the details to bring someone up to speed."

"That makes sense, have you got someone in mind?"

"Frankly, you. I know how organized you are, and preparing for all those IRS audits was great training. Plus you've caught on amazingly fast here. I'm sure we can get you up to speed in no time."

"Hmm. I'm not sure I'd like the idea of working for you; don't they have a policy against working for your spouse?"

"I mentioned it to Jennifer, and you could work directly for her."

"You talked with her before even talking with me?"

"Just a hypothetical, nothing set in stone."

"Have you already talked with Wanda too?"

"Well, Jennifer might have mentioned something to her. I heard you could transfer in two weeks, if you were interested." I said, in my most innocent sounding voice.

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The following day I got a call from Rita,

"I'm in labor, we're on the way to the hospital now."

"Oh my god, that's wonderful! Tell Lucas to be extra careful driving. Do you need me to bring you anything: change of clothes, something for the baby to go home in?"

"We've had everything packed for weeks. Just get here as soon as you can. I want to make sure you're the first one after us to see little Billy."

"So you've already named him?"

"Last night, William Richard."

"Dad's name for his middle— he'll be very proud. Good work, sis. I'm on my way."

Chapter 20

"Meet me?" Bev texted the following week.

"On my way", I immediately answered. Walking by Tina's desk on my way out, I told her I'd be back in a bit.

The coffee shop midway between our offices was our unofficial meeting place whenever we needed to talk about something private. We didn't use it often, but lately, it'd become a more frequent hangout. Bev's period was due any day, so I guessed it was the reason. *It must be me,* I thought. *No way would it take this long without one of us having an issue, and since we know she's okay, it's me who's the problem.*

"Hi," I said hugging her before pulling up a chair. "Thanks for the coffee. Everything alright?"

"It came today. I'm not too upset, but it's still a big disappointment."

"For me too. I figured that's why you texted. I'm sorry I've let you down," I said, lowering my eyes so she couldn't see me tearing up.

"Hey, it's no one's fault. Look at me Joe." She saw my tears and took my hand. "We don't know there's anything wrong."

"What if we waited too long, I'm the one who kept saying 'just one more year' for all those years."

"We didn't wait too long; plenty of men father children in their forties. Let's not jump to conclusions. Get the testing done then we'll know what our options are."

When I got to back to the office, I scheduled an appointment for the following week and tried to concentrate on work to take my mind off it.

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When Bev transferred, Mason and I began getting her up to speed. We camped out in her new office down the hall from mine, reviewing every aspect of the project. In the mornings, we'd bring in analysts working on a specific portion to get into the details. In the afternoons, we'd do a teleconference with Antonio and his group to review each other's progress and compare specifics of the morning's topic.

Bev put everything in project-planning software, especially timing. She knew nothing could be overlooked for a project of this complexity to be successful. This is where we differed; I kept track of things, but not down to her level. For example, I had a dozen line items for the linear move irrigation equipment, and relied on experience and the supplier to make sure all the smaller details got done right. For the same item, Bev had at least fifty, everything from the wheel size to the irrigation hose connections. I realized that was partly why I had to become so involved in a project; I needed to throw myself into every detail to make sure nothing was missed. Instead, Bev would meet regularly with the group responsible for an item, discuss it thoroughly, and then check it off when completed. If she found a behind-schedule item that affected the overall timeline, she'd bring it to our attention so more resources could be added to get it back on track. Mason and Bev made a good team because they complemented each other. He made sure the analytical part was done right, and she put the details in place to get them implemented.

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When the day came for my appointment, I knew what was expected since they doctor's office had emailed me the process. First there was a urine sample, then the physical exam, and lastly, my sperm sample. I was free to bring my own materials to get me in the mood, or they had a selection there. I couldn't imagine browsing their well-used stock, so I stopped at a bookstore on the way to the appointment for a men's magazine. There were several options, with all but the titles obscured. The first few titles were raunchier than my tastes, and I embarrassingly left with nothing when other customers began passing by. Hopefully there was something not too repulsive at the office.

My physical started with the doctor asking about any medications I took.

"The only prescription is for high blood pressure. Plus the occasional over the counter pain killer or decongestant."

Then he reviewed the things we shouldn't use during sex: lotions and potions, no hot tubs, and so on. I assured him we'd read up on all that before we began trying to conceive. I even started wearing boxers. Assured, he did the exam without seeing any issues. By then, the urine results had shown up on his computer.

"Everything is in the normal range," he explained reassuringly.

Lastly, he pointed out the donation room down the hall on the left that contained a sterilized container with my name already labelled. I opened the drawer for magazine options but couldn't bring myself to even touch them. Instead, I browsed the DVD selections in their plastic housings, but again none appealed. Finally I searched the TV options and found something that allowed me to fantasize about Bev doing one of her seductive stripteases in lacy lingerie.

"How'd it go?" Bev asked when I got back to work.

"The urinalysis results came back normal, and the physical also went fine. You don't want to know about the other, I'm still embarrassed," I felt my face redden at the memory.

"Multiply your embarrassment by ten, and you'll have some idea of how a woman feels during an exam with our feet in stirrups," she chuckled.

After Bev was up to speed on the desert project, I went back to the project for the president's next announcement, directly capturing carbon from the air. My research into potential industrial uses to offset its cost had led me to two viable options, creating fast-growing algae farms to produce biofuel or making synthetic fuel. After doing the calculations, the algae-farming option wasn't as efficient as the kelp ocean farms at producing biofuel, so I concentrated on the synthetic fuel option.

Bernice's team had finally come up with its basic structural design as well as an absorbent material with a chemical coating. Once completed, the remainder of the design quickly fell into place. Large fans would direct the air to the structure, which would absorb the CO_2. Once saturated, the removable material was transferred either to a facility that would steam off the CO_2 for permanent underground sequestration or post process it into synthetic fuel.

To make synthetic fuel, the CO_2 had to be converted to carbon monoxide with an electro-catalyst. Lots of options had been studied over the years, and the most efficient catalyst was found to be a mix of copper and oxygen in combination with copper oxide electrode coated with an atomic thickness layer of tin. Electricity produced by solar cells directly connected to the electrolysis cells calculated to be the most efficient power source. The resultant carbon monoxide would be stored in tanks for delivery to a facility for hydrogen addition to produce synthetic fuel hydrocarbon chains.

The next step was to figure out how to get hydrogen as economically as possible. Mason provided the solution.

“We can get all the hydrogen needed from post processing the desalination brine; our desert irrigation will be producing so much of it it’s sure to be a cheap source. Electrolysis separates the hydrogen out, so if we use the same energy source as the desalination plant, we’ll be using low-cost energy as well.”

Lastly, we calculated the amount of synthetic fuel needed to fully replace the remaining petroleum in all forms of transportation. This would be after the Jatropha was fully planted and biofuel production from all sources was fully operational. Greatly helping the cause was significantly reduced fuel demands as mass transit, electric and autonomous vehicles, ride sharing, and working from home all continued their steady rise. This determined the amount of air capture machines and processing plant capacity that were needed.

In his announcement, the president summarized all of these points; then he asked the nation for their support to once and for all end the use of petroleum for transportation— a monumental step on the order of ending fossil-fueled power production. It would still take years to achieve, but the end was at least in sight.

The following week was my follow-up fertility doctor visit. With hardly a look up from his notes, the doctor announced the issue was a low sperm count, probably from a hormonal deficit in combination with my age. To decide the best treatment, he wanted me to have my testosterone checked. So for two consecutive Monday mornings, I went to the clinic before work to get blood drawn. A few days later, his office called to say my levels were normal, and they were calling in a prescription for an oral hormone treatment to my local pharmacy.

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Over the Fourth of July, my parents came for a visit. Mom had called while I was out of contact in the desert, and Bev had told her about my anger episodes. After I’d been back a few weeks, they called and arranged to visit. Dad was still recovering from a recent hip replacement, so other than short rehab walks, we mostly stayed inside and caught up. Their first evening here, I told them about my desert experiences and then both our trips to the Marshall Islands. The next evening they came with me while I gave an orphan presentation to the Lions Club. I found videos to be the best sales pitch, so I had lots of them featuring the kids in their everyday surroundings. Most of it was upbeat, showing the kids playing and panning for the camera, but one was terrifying, showing a storm ripping through their shelter, destroying much of it while the kids cowered under their beds. It was always the most effective, and moved Mom to tears.

After dinner on their last night, we told them about our ongoing difficulties starting a family. They were thrilled with the thought of another grandchild, but I could almost see mom's maternal instincts kick in after hearing of my low sperm count treatment. Even though I reassured her it would work out, I sensed her hesitation. Dad reminded her about his brother, Uncle John, who had a similar problem, but with treatment he'd had two healthy children. This was news to me. When my doctor had asked about any family history, I'd said we didn't have any. But now I realized I should have asked, knowing it wasn't a subject that would have come up at a family gathering. I asked Dad more about Uncle John's diagnosis and treatment, then made a mental note to call the doctor in the morning with this new information.

The following Wednesday, I went to Oscar's meeting, as we referred to it. I was an irregular attendee, making about half of the meetings, but I especially wanted to make this one to talk to him about the NRC findings on the data I'd brought back. Sitting next to Bev, we watched as, one by one, the kids introduced themselves, smiling shyly as they said their name in Marshallese, followed by its English translation. They each took about a minute giving their age, grade in school, and hobbies. They all finished the same way, by telling their favorite thing about the islands.

When it was Langidrik's turn, Bev took my hand and whispered, "I just love this guy," and followed his every move, enraptured. His sister, Bujen followed, and Bev unconsciously squeezed my hand and glancing at her face, I saw an expression of pure joy.

After the kids all spoke, I talked privately with Oscar as the meeting broke up. "They reviewed the data I brought back and confirmed the high readings and potential for consuming contaminated fish. They also said the cancer rate of

Majuro was a hundred times that of other Pacific islands. They're going to send out measurement equipment to map a much larger area and measure marine life for contamination levels. They're also sending out a team to Enewetak and look into sealing it better."

"Did they say why they stopped taking radiation data in the first place?"

"They told me it had been stable for so long, they just figured it would always stay that way."

The following day, my doctor's office called and told me to come to back to their office for a DNA swab. "At least I won't need a dirty magazine for this one," I said to Bev, trying to make light of it.

Chapter 21

The first several weeks at my new job had been a whirlwind of activity trying to keep the trial pieces moving forward while keeping track of what needed to be done next. The long lead items were dealt with first: irrigation ditches were being dug and their piping ordered; well-pumps with solar panels for power were on their way; Jatropha hybrid orders were placed with nurseries all over the country; and irrigation machinery was nearing completion.

Next in line were the planting-related items. Mason's group finished their analysis of the soil samples to determine which minerals and their quantities were needed. Proper levels of nitrogen, phosphorous, sulfur, calcium, magnesium, and potassium along with high carbon and a tightly controlled pH were optimum. We chose from a large range of organic fertilizers to achieve their proper levels: bone and fish meal, kelp, compost, peat, biochar, animal manure, cover crop, and seed cake remains from biofuel processing. Vast amounts of topsoil would be needed due to the desert sand and general rockiness so rail cars would be used for transport from surrounding states. After being unloaded into dump trucks, top soil would be mixed with their enhancements before being spread by bulldozers.

The last detail was automating tree planting for speed and efficiency. After researching the alternatives and conducting trials, the team selected a system that used drones to carefully map and then deliver a germinated seed to its proper location. By housing the seed in a spherical shell and using pressurized air, it would break when it hit the ground, sending the seed deep enough into the fertile soil to begin its growth.

Finally everything was in place for planting to begin in the fall. Since we didn't need to worry about inclement winter weather, planting the million acres was expected to finish before spring.

In late July, I went with Joe to his appointment to get his DNA test results. After a lengthy wait, the doctor came in and explained that Joe had a genetic deficit in his Y chromosome, causing the low sperm count. He still produced it, he explained, just not very much, and it was weak on top of that. The combination made the chances of a natural conception remote. The most likely option for a successful pregnancy was a procedure known as

IVF: externally injecting Joe's sperm directly into some of my eggs then placing them back into my uterus when cell reproduction got underway. He handed us brochures that went into more detail then explained the high cost and relatively high risk of being unsuccessful.

After leaving his office, we walked to a nearby park, found an open bench and read more about it.

"I don't like it, you're taking all the risks: anesthesia and invasive surgery. My only risk is more embarrassment and elbow soreness from making more donations into a cup," Joe said, looking up from the pamphlet.

"One of the risks is not being able to get pregnant in the future. But since we already can't, I don't see that as an issue."

"What if you finally come to your senses, divorce my sorry ass, and find someone else to father your child?"

"Don't think I haven't given that some thought; so toe the line buster. It says the percentages of having a successful pregnancy are based on the individual couple's sperm, egg, and other health factors, but we can try multiple times if not successful the first. But it costs each time." She said as we strolled over to a nearby trail.

"I don't want money to decide our parenthood, I'd rather quit my lower-paying government job and go back to work in private industry where I'd make enough to have children."

"That may be the best thing you've ever said to me." I put my arms around him and kissed him tenderly. "You'd give up the job you're so passionate about for us. That does it; now you're stuck with me for good."

"What would worry me more is chances of multiple miscarriages and procedures," Joe said as we walked one of the dirt paths, lined with brush and bamboo grass, mature oak and maple trees just beyond.

We stopped to watch two squirrels chasing each other up the maple then jump to the nearby oak limb, finally scurrying down its trunk, lost in the dense shrubbery.

"It says I'd need to get hormone treatments to produce more eggs. Do you know what those do to a woman's mood swings? Imagine my period personality multiplied by a hundred."

"What about the elephant in the room?" Joe asked as we resumed our way along the trail, trying to dodge a series of tree roots.

"Huh?" I asked, stubbing my foot against a nearly invisible root.

"Oscar's kids. We've both been there plus watched them for hours on video calls; you can't tell me they haven't crossed your mind."

"They have, but my first choice was to bear our own child, nurse it, and create the bond I hear moms talk so much about. Do you think we'd be selfish by going to all the trouble and expense of fertility options when there are dozens we already know that need parents?"

"Probably."

"So why haven't we talked about it before now?"

"I really thought you'd be pregnant by now, and maybe for our next, we'd think about one of Oscar's kids."

"You'd want two?" Bev said, smiling for the first time.

"I think so, but I want to see how the first one goes. It's going to be a change in our lives. I just don't know how much. But we both have a sibling and many of our co-workers have two or three and still seem quite happy."

"But if we have two, it's a no-brainer for me; I'd want Langidrik and Bujen. Every time I see them in the calls, my heart aches. I vividly remember how she felt curled up on my lap while reading stories and him sitting at the homework table, paying rapt attention to the older kids."

"I feel something special when I see them too. He's six and will soon start school; just imagine how he'll feel when he's actually doing homework with them. And what I remember most about Bujen when I visited, was her love of the water; she already swims like a fish. If we adopted them, would you miss pregnancy, nursing, and all the joys of an infant?"

I had to stop and think. It was a peaceful quiet to counteract my busy thoughts as we were deep in the woods away from the city noises with only the insects, birds, and trees squeaking in the wind to accompany us.

"It's probably the biggest reason I haven't brought up adoption before. But after seeing the kids week after week on calls, and knowing how much the Simpsons adore Dilini, it makes me realize I could still love a child without going through pregnancy. What about you? Would missing the "firsts" like teeth, words, and walking be too painful?"

"You know the thing I hear most from dads about their favorite baby experience? Laughter. They tell me there's nothing like it. How it makes all the diaper-changing, sleepless nights, and vomit clean-up worth it. They melt whenever they hear their baby laugh."

"Oh my god, I don't know what to do! My heart says do both." I gasped.

"Mine too. Why not?"

"Three kids? Almost all at once, are you nuts?"

"Well, let's talk it through. It was about six months for the Simpsons' adoption, and ours should be quicker since we've both been there, met them, and know the process so well. Maybe we'd get them by year's end."

"That seems so soon, but having them by Christmas would be wonderful."

"We could alternate and each take Family Friendly Leave until they're both in school next August, and then work out how to handle after school."

"We need to get more info at the clinic, but I imagine you'd either be pregnant by then or we'd realize it's not going to work for us."

"You know what I just thought of? If we waited through a round of IVF and still couldn't get pregnant, Bujen and Langidrik might already be with someone else. They're so adorable, they're sure to win someone else's heart. What about our finances? Can we afford to do both?"

"I'll run some numbers tomorrow, but it'll be tight for a while. There's going to be a lot of extra expenses with both the IVF and adoption procedures, plus only one paycheck coming in while we do our leaves." I said. "But I bet we can swing it if we cut back on a few things. Plus, my annual review is coming up and I'm expecting a healthy raise."

"As long as we don't lose the house, let's go for it. Let's call Oscar tomorrow and talk with Bujen and Langi to give them the news. But tonight let's try getting pregnant the old-fashioned way before we give science its chance."

"Langi?"

"Bujen calls him that. I think it's cute, not so formal sounding."

"Okay, Langi it is."

Chapter 22

After Bev and I finished our call the next morning, I met with the mineral sequestration team. Led by Stacey Roberts, it was our final carbon capture project to be announced. In reality, it had been our first, starting six years ago with analytical studies, and then progressing to experimental trials so we could determine its future course. Conceptually, it mimicked Mother Nature's mineral sequestration, only faster. In nature, silicate rocks were slowly broken down by the slightly acidic atmospheric CO_2 and dissolved by rainwater into inorganic bicarbonate that got washed into streams, rivers, and ultimately the oceans. There, they formed into calcium carbonates such as limestone and dolomite. Over the eons, much of the Earth's carbon had been stored in these rocks. Since they had a slightly basic pH, they naturally acted to lower the ocean's acidity level. But in nature, the process moves at a geologic pace. Plus many surface rocks have become covered with a crust, slowing the breakdown.

For decades, scientists have known that certain types of silicate rock, such as dunite, could be mined, crushed into small enough grains, and deposited over the land and sea. These grains absorb the atmospheric carbon and eventually become calcium carbonate, increasing the pace of carbon sequestration. But a few things held it back. For safety, we needed a mining process to ensure nothing harmful, such as asbestos or other toxins, came with the mined rock. Then, a pulverizing process was required to produce the correct size grain: large enough not to be inhaled through nasal hairs, which could cause lung irritation or worse, but small enough to decompose in a timely manner.

"We've had six pulverizing companies come in with their proposals," Stacey began. "They were each provided rock from the twenty mines that have been identified containing high levels of dunite. Five of the companies produced samples that met our grain size and air quality requirements. The sixth is in the process of installing a better ventilation system and then will repeat the study."

Phil, the lead analyst, spoke next, "Our multi-year study looking at rate of dissolve, pH increase, and soil and water changes in various environments is now completed. Using the results, we developed an algorithm that calculates carbon capture based on the area where it's spread."

"What about the soil and water effects in those locations; have we seen negatives from absorbing all those grains?" I asked.

"Not at the levels we've been doing. In fact, there were positive outcomes. The pH level of the nearby water rose, not much, but directionally correct to counter some of the reduction over the past decades from acidification. Plus the soil's carbon increased, with all the positives that entails: better fertility, nutrient dispersal, and erosion resistance," Phil added, reviewing his notes.

"The last part of the trial was to evaluate different dispersal methods," Stacey said. "Cindy led that study and will take you through those results."

"Thanks," Cindy began. "Our team took this on with great enthusiasm, knowing it was at the heart of the project. We broke it down into two categories: current and new dispersal equipment. For current, we evaluated everything used for spreading products of a similar size like salt, seed, and fertilizer. We started with lawn spreaders, both hand held and push cart sized; then we moved to industrial-sized ones used for fertilizers. Next came spreaders that could be attached to vehicles, anything from pickups to dump trucks. Basically, it came down to how much variation they allowed in their settings, and almost all had enough to spread the pulverized dunite grains.

"Our new equipment team came up with options that would spread in sites where current ones couldn't reach, such as forests and hillsides. These were essentially water tanks with sprayers equipped with pumps and agitators that would keep the mineral in suspension during spraying. They come in all sizes from ones that could be mounted on a person's back to large tanks with long hoses carried on trucks."

"Great work," I said. "This project has so much potential that I bet our ¼ GT target will easily be achieved."

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My next congressional report out was scheduled for the week's end, so I pulled together the status. We were seeing carbon capture successes everywhere: There were increases in demand for our ocean programs and biochar, the economics were on track for carbon air capture to create synthetic fuel, we had worked out how to increase desert afforestation, and now positive trial results with mineral sequestration. Plus, emissions reductions were now running ahead of target due to quicker reductions in petroleum use for transportation. It was almost too good to be true. When I totaled everything, we were now exceeding the president's target.

When the president made the mineral sequestration announcement a few weeks later from the rose garden, he outlined his strategy with help from several enthusiastic teenagers pushing lawn spreaders and with sprayers strapped to their backs. "The mining and pulverizing costs will be paid for by the monies from overachieving our target," he began. "Then the dunite grains will be delivered to centers all over the country."

"Here's where we need your help," he said, the camera focusing on the teens spreading and spraying, showing close-ups of the flying particles. "Just like these fine lads, we need you to spread the grains. It's safe, and we're making it as convenient as possible. We'll be doing it in stages. Stage one will be personal property and public lands. There'll be containers for you to transport the dunite home in and we'll tell you what setting to use on your spreader, and how often to reapply. We'll be signing up volunteers for group projects to any and all public lands in your area. This we'll spread with trucks and special equipment for the more challenging public lands. Stage two will be asking businesses to have an employee work day to spread the grains over their lands. Businesses that need help will have volunteer sheets available at nearby local centers."

On a Saturday in mid-September, Bev and I were watching the news when they began talking about a large storm in the Atlantic, gaining strength as it approached the coastline. The following day, the National Weather Service reported it would make landfall midweek along the North Carolina coast. By Monday night, it had been upgraded to a category four named Hermine with landfall expected near Wilmington. The governor ordered mandatory evacuations for all coastal counties. Virginia did the same thing Tuesday, knowing its path would turn northward after making landfall. Area centers began putting their disaster plans into action: texting evacuation routes, announcing shelter locations, getting buses to prearranged sites, and reminding everyone how to prepare for the storm and its aftermath. Behind the scenes, regional centers were sending in extra supplies and personnel.

When Hermine hit the coast Wednesday night, winds had reached 150 mph, and it began systematically mowing down anything in its hundred-mile path that wasn't firmly anchored. Roofs peeled like bananas, trees and power lines fell like dominos, and loose items were perilous to anyone caught in their way. Even though it slowed as it turned north, it continued its deadly onslaught. As it left an area, the storm surge was already underway. Waves of nearly thirty feet were reported, breaking area records. More were broken when the eight-foot storm surge came several miles inland, carrying away everything the winds had knocked over. But the immediate impact was only the start. As the rains persisted, they dropped more than three feet over the next several days, flooding nearly everything at ground level.

As the storm approached our area, the weather service was still predicting wind speeds up to seventy mph with heavy rain. On Thursday, the president closed federal office buildings so the levee system protecting downtown could be installed. The levee had designed breaks along its perimeter, allowing traffic flow, so sections of it needed to be assembled before a heavy storm. When flood maps became forward-looking several years earlier, the levee system was found to be at high risk of breach. The area was already subject to flooding just from heavy rains, so a levee breach would be devastating to the abundance of historic, irreplaceable items housed there. Even though the levee had been strengthened and raised, computer servers and many historical items were relocated to a more secure location, miles from downtown. Upgrades to the computer system and security firewalls allowed federal employees to work from home, with few disruptions in trial periods done since.

The mayor declared a state of emergency beginning Friday, closing all public transportation and roadways except for emergency vehicles. Mandatory evacuations weren't done, but anyone in low-lying areas was advised to seek shelter. Local centers already armed with the information, began collecting those at risk.

Bev and I continued monitoring the storm after it made landfall. Our house was on high enough ground that it wasn't in much danger of flooding, so we decided to stay at home. Policing the area, we stowed our outdoor things, and then stocked up on staples such as groceries and cleanup supplies. I made sure our home battery was fully charged, since the next several days were predicted to be nearly sunless. We prepared our two guest rooms and sent out word to neighbors they were welcome to stay if they became flooded or their power was out for an extended period.

By Friday morning, black clouds were visible, and radar showed rain and heavy winds would begin about lunchtime. We watched as the wind came in force, bending our less mature trees horizontal. We didn't get much sleep that night as the heavy winds, branches, and debris blowing against the house kept us awake. The winds and rain continued all day Saturday and again that night. By noon Sunday, it had died down enough for us to do a survey of the yard, bearing an umbrella and boots. We'd lost one large tree, but luckily it had fallen against the fence, not the house. Debris of all manner was scattered about, not just in our yard but all our neighbors' too. The streets were impassable as downed power lines and large trees blocked the way. There was lots of standing water, but not high enough to reach our door. We checked in with the neighbors, exchanging stories of damages. One had a tree fall against their house and another on their car. Several homes had flooded, with water nearly a foot high.

We repeated our offer of spare rooms, and the Collins: Zack, Bonnie and their three-year-old, Daisy, took us up on it right away.

"Water's up to our shins. Even our beds got wet, and with the roads blocked, we can't get to family across town," Bonnie said gratefully.

With a few other neighbors joining in, Zack and I spent the rest of the afternoon unplugging all the Collins's electrical devices and putting as much out of the water's reach as possible. One of the neighbors brought over several concrete blocks, and we placed furniture atop them to keep it as dry as possible. Then we concentrated on perishables such as food, clothes, linens, and blankets, making sure everything was stored safely out of direct water contact. Then I helped Zack load suitcases with overnight things, and we trekked back home, thoroughly saturated, where Bonnie and Bev had a warm dinner prepared.

"I'll call our insurance company in the morning, but we don't have flood insurance, so I don't think we'll get much," Zack said. "So much is ruined; it's going to be like starting over."

The next day, another neighbor, the Beavers, called asking if the other bedroom was still available.

"Sure," Bev said. "But it only has a full-sized bed."

"We'll bring sleeping bags for Sylvia and Charlie, and tell them it'll be like camping out.

The next few days were unforgettable, as the house was a flurry of activity from all the people there. During the day, I usually went with a contingent, helping neighbors clean up and do minor repairs. Bev helped organize the food prep for meals, which a couple of ladies would deliver to the hungry workers. The evenings were a little less hectic as everyone was worn out, but they still needed to eat, bathe, and get the kids down for bed.

"This is good practice for when ours come," Bev whispered one night at the height of chaos as the two Beaver kids started fighting and little Daisy began crying. "What would we do in this situation?"

"These are very tough circumstances for everyone: strange surroundings with little to do for the kids. They can't even go outside to play and get rid of some of their energy; it's still so wet everywhere. I'm surprised it hasn't happened more often."

"They've generally been good but we just aren't setup for kids yet; no toys, video games, and just one TV without cable, which the parents usually watch the news coverage on. All they can do for electronic entertainment is use their parents' phones, but the parents often need those to deal with their flooded homes."

On Wednesday, the Collins were able to go back home, on Thursday, the Beavers followed, and we were able to start working again, albeit from home. Many downtown federal buildings had standing water with estimates that it would take more than a week for the water to recede enough to reopen roadways; then the clean-up and repair work could kick into high gear. The work to pump out the water and clean the mess from our federal buildings would take several more weeks.

All along the path of Hermine, disaster stories abounded. Once the water receded enough for the millions to begin returning to homes and businesses, the extent of its devastation became known. For miles inland, from North Carolina to New Jersey, the water and wind had wreaked havoc. The long process of repair and rebuilding would likely take years to complete. Evacuations, planning, and preparation had spared many, but the death toll had reached 374 and was still rising. Thousands more were hospitalized from illness traced back to several flooded sewers spewing raw sewage. In some areas, the stench of excrement took weeks to pass. Injuries from people clearing debris and repairing housing damages were commonplace.

Damages were estimated at a half-trillion dollars. Millions had originally lost power, and three weeks later, many thousands were still without. Centers and emergency shelters were overwhelmed with people seeking dry places to sleep. For most department personnel, it was all hands on deck as backup generators and emergency supplies were hauled from every nearby, non-affected shelter to temporary shelters being set up in public buildings of all types to deal with the crisis.

Since our offices weren't going to be ready for several weeks, Bev and I rearranged the den so we could both work from there. It was nice having her nearby, and over the weeks I frequently snuck glances at her, noticing how she bit her upper lip when she was concentrating or muttered to herself when something went wrong. I wondered what little quirks she noticed in me.

When roads became passable again, Bev and I visited a fertility clinic to learn more about the process and get started. “Can you believe all these couples?” I whispered, sitting in the full waiting room. “We're sure not alone with our issue.”

Once we got to a room, the nurse spent time telling us what to expect: hormone injections in Bev's stomach to increase our chances, my sperm donations, follow-up screenings, and then harvesting her eggs in a few months. “We'll be able to give you an idea of your chances once we've gotten that far. If you decide to go ahead, just call and schedule your first appointment.”

“We've already discussed it,” Bev replied, “we'll take your first available.”

Chapter 23

I spent the time working from home coordinating, the Jatropha trial planting and irrigation. I had daily calls with the multiple on-site teams for updates. Trying to keep tabs on nursery supplies, drone planting issues, aquifer irrigation details, machinery uptime, and staffing issues kept me hopping. The three-hour time difference didn't help things either. I started at my normal time but typically worked till it was quitting time out west. Joe told me I would soon be getting my membership card for workaholics anonymous.

Staffing was a big part of the project. Large numbers of workers were needed for installing well pumps, digging ditches, laying irrigation pipe, operating machinery, and various planting portions. Since there were four states involved, each got a percentage of the jobs. They had the responsibility for staffing and training, but it was still up to me to make sure things got done right, and I had each state rep on speed dial if not. I should have been there in person during this phase, but there was no way with the IVF and adoption processes happening simultaneously. Frankly, with so much land area involved, I wouldn't have been able to see much of it anyway. I needed to rely on technology and let the on-site teams be my eyes and ears.

During our second week of working from home, another large hurricane was being monitored and expected to make landfall on the New Jersey coast. It was getting stronger as it approached land and was expected to be another historic-level storm.

"Why would we get two historically powerful storms so close to one another?" I asked Joe.

"The conditions are still there that caused one, so others of historic intensity are more likely. It's become fairly common."

We followed the storm as it made landfall and slowly turned north, dumping massive rains across the region. It didn't dissipate until New Hampshire, but by then nearly a million people were evacuated. Flooding and storm damage was expected to cost hundreds of billions. Nearly 400 had perished in the storm and its aftermath.

Working from home had its positives when it came to the adoption process. The best part was we could do video calls with Bujen and Langi more often and not be so impeded by the time difference. Plus we could fill out all the forms, make the necessary phone calls, and be home for visitations with more regularity. Since we knew the process so well and Oscar was pulling all the strings over there, things were progressing very quickly. Having them here for Christmas was looking promising.

“We need to finish getting their room ready,” I said to Joe after our most recent correspondence confirmed everything was on track. “I wonder if they celebrate Christmas, let’s find out on our next call. If they do; I bet it’s different than here.”

That weekend we went shopping. They wanted to be in the same bedroom, so we got them bunk beds and their own dressers. Langi liked super heroes, so he got Spiderman-themed bedding and linens. Bujen really loved the water, so hers were boats. We wanted a border about head high, and I won the argument for the baby animal theme. We’ll change it in a few years to what they wanted and move it higher as they grew. Clothes were easier than expected; they just wanted the basics: pajamas, socks and underwear till they got here, and then they’d come shopping with us to pick out their own outerwear.

I started giving myself hormone injections and within a few days started suffering side effects. I had bad headaches almost daily. Over-the-counter drugs helped a little, but the best treatment was to close all the curtains in our bedroom and lie in near total quiet and darkness. I even made Joe close the den door, not wanting to hear his keyboard strikes. I also had “tenderness” in my breasts. Well, tenderness didn’t quite describe it; it was more like having a mammogram done around the clock. Sex became off limits; don’t even ask. Joe was suddenly cut off after more than a year of steady orgasms.

“I’ll make sure I don’t touch your breasts, and you can be on top,” he said after two weeks of abstinence.

“How about I squeeze your dick in a vice first, and then see if you still want me,” I replied without missing a beat. Then I realized maybe there were three side effects to the treatments. But I hadn’t been too moody—

just a few times— and all were warranted. Like the time I started crying because there wasn't rocky road ice cream in the house.

"But it's midnight, the stores are closed," Joe had said, in a fake soothing voice.

"Not all the stores are closed, if you really loved me, you'd find an open one that delivers, I bet there's even an app for that." It took an hour for the delivery, but it was worth it.

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"Christmas is a big celebration on the island," Oscar told us during our next call. "Preparations begin in a few weeks with the formation of singing and dancing groups called "jebtas". They practice till Christmas day, when they perform for the islanders."

"Will Bujen and Langi be in one?" I asked.

"Yes, they'll practice daily after school."

"We can't let them miss the performance. Can we come for the holidays, and if everything's ready, take them home after?"

"That'd be great, I'll prepare the paperwork that way. You can watch their group practice on one of our calls," Oscar said.

By mid-October, our offices were ready for us to return. I'd missed everyone: texts, and emails just weren't the same, so over the weekend I made several loaves of banana bread to welcome everyone back, including one for my old ag group. As people stopped by for a slice, I caught up on how all had fared during the storm and its aftermath. Peggy, one of Mason's analysts, had the worst experience.

"Our house was on a hillside and was literally washed away in a mud slide. We've staying with my parents till we can get back on our feet. We spent so much time trying to deal with insurance and emergency services, but nothing is resolved yet. We still owe a lot of money on the house, so we're looking into the legal ramifications of just stopping payments, but I'm worried we won't be able to get a loan for another house for many years."

I tried to think of something comforting to say, but words failed.

"Let me know if there's anything I can do" was the best I could muster.

Andy Hopkins, the desalination team leader, stopped by with an update on his team's work.

"We made tremendous progress during the time away. I think getting away from everything else helped get us focused on just that portion. By the way, thanks for handling all the planting details. Mason filled me in on everything going on. He said it's amazing all the balls you juggle" Andy bent over to pick up some crumbs he dropped.

"We've made lots of progress on preparations; planting is set to begin in a couple weeks. I can hardly wait. What's the latest on desalination?"

"As you know, part of the desert land use agreement was to enlarge the Carlsbad desalination plant near San Diego," he began. "It'll provide the added water promised for the area as well as displace the portion currently provided from upstream canals. So instead of having those canals take reservoir water to the city and surrounding farms, it'll go to the desert. That saves much on irrigation digging and laying pipeline. The other big news is energy usage for the enlarged plant. It uses a process called reverse osmosis, which is basically pushing seawater through semi-permeable membranes. The membranes filter the salt ions, leaving pure water. That's where most of the energy gets used. It takes very high pressures to push the water through."

"Joe told me about new membrane materials that have been developed using a material called graphene," I responded. "He tried explaining the chemical process they use to make them only a few atoms thick, but my lack of chemistry background let me down again."

"They're amazing. Even though they're incredibly thin, they're strong enough to withstand the pressure needed to pass water through. The pressure is lower, so it requires less energy. Plus there are energy savings because there doesn't need to be as much pre- and post-processing. We can nearly double the capacity without adding more energy capability."

"That is great news! The last I heard, finding a place for the planned wave energy systems was meeting a lot of resistance, especially from the surfing crowd."

"Who knew they were so organized?" Andrew paused, interrupted by Taps.

"Damn," I said, flustered. "That's one thing I sure didn't miss working from home. I'll catch up with you later; I've got a standing appointment."

Amy and I hadn't stopped our walks just because we were in different groups. In nice weather, we met midway between our offices and walked the circuit and during inclement, in a coffee shop down the street from my building. It was raining today, so I made for the coffee. Arriving first, I ordered the fall special, pumpkin spiced lattes.

The timing was actually pretty good since we had a few things to prepare for our next meeting. It was going to be our largest yet, due to Joe's community visits, and we'd had dozens of RSVPs on our newly begun Facebook page. Our presentations were already down pat, but we were adding a new aide, Brenda, who was needed because all of the additional attendees. She worked at an adoption agency, and Amy said she was a whiz with the process. So we both reduced our allotted times to give her plenty of time.

Walking back to our offices after the lattes, Amy commented, "You know I'd have probably quit by now if you hadn't of shown up when you did to help me through these alarms. It seems like there's been more than ever this year."

Thinking about Amy's comment, and having just experienced our own disaster, I dug deeper into the website than usual. First, I read about the cause of today's alarm, tornados in central Texas, causing heavy property damage. Then I moved into historical disaster statistics, and studied a graph showing the number of large climate disasters by year, the ones that set off a Taps. From the start of the century, there had been a huge run-up, culminating with the drought years. Then they started coming down as the successes from the department programs had begun to take effect. After that there had been steady and deep drops in deaths and property loss. But they'd leveled off in recent years, with last year showing an increase over the previous for the first time since the department began. And sure enough, this year was running ahead of last.

I thought about all the safety measures put in place over the years: coastal protections, reduced food and water risk, infrastructure improvements, plus all the features of the centers. But as I'd learned all too well in my time here, the risks can only be reduced, not eliminated. Even with all the global reductions since the Paris Agreement, there was still carbon going into the atmosphere. Knowing the decades-long time lag for atmospheric effects to play out around the globe, we were still seeing the effects of emissions from before that time, and they'd continue to worsen for decades from the emissions released since. But what scared me most was feedback. It was rising even as direct emissions were falling. But the atmosphere didn't care where it came from; it would still wreak havoc. That's why net zero wasn't good enough, feedback was getting too high. That's why there were all these projects to remove the excessive carbon.

"Thanks for the bread," Jorge said, interrupting my thoughts. "It's delicious."

Jorge was the team leader for the Mexican desalination plant. There was a large group stationed here to make sure there was coordination between all the teams. Similarly, we had several people on location in Mexico City.

"How did your team fare during the flooding?"

"Better than most since we're staying in hotels. We were without power for only a few hours before the backup generators kicked in. But we were getting antsy working from a hotel conference room. We were very happy the building opened back up today."

"How are your desalination plans coming?"

"A big decision was made on where to put the tidal lagoon and desalination plant. They're going to be in the northern part of the Gulf of California, at Bahia Adair. A causeway will enclose the bay with bi-directional turbines at its mouth where the sea enters and exits through sluice gates."

"How long will the causeway be?"

"Several kilometers, but we're also going to use some of its energy to provide power to the surrounding areas. Likewise, the desalinated water will serve the area as well be used for the desert irrigation."

"Andrew updated me on graphene membranes; will your plant use those?"

"Yes, plus we're incorporating other efficiency measures, like pumping the seawater during the tides to maximize the tidal height change."

"How's that work?"

"During low tide, it'll take water from the lagoon to further lower its level, and at high tide, redirect post processed brine back into the lagoon raising the level higher than its normal tidal height."

“I remember Joe mentioning a tidal lagoon he’d visited is used as a community water park with sailing, fishing, and swimming activities. Will yours do that?”

“The pumping is a safety concern, so instead, the lagoon will become a coral farm, growing new strains to help replace the ones dying out.”

My phone buzzed, noting it was the doctor’s office, I excused myself to answer it.

After hanging up, I called Joe, “They’re ready to harvest my eggs, my appointment’s in two weeks.”

Chapter 24

Leaving the clinic, I was happy as a lark, knowing I was finished with the masturbating into a cup phase. I’d had to make a “deposit” several times over the past couple of months, and it never lost its sense of embarrassment and coldness. Tomorrow was Bev’s procedure and I was excited. Bev was a little less so, trying not to get her hopes up. That night was our first Halloween in our new house and we’d gotten a big selection of candy, not wanting to be known as a dud house. We also picked up a few decorations, deciding to wait till next year to more fully decorate when the kids were here.

“What do you think they’ll want to be next year?” Bev asked as we hung out on the porch, candy in hand.

“I’m not sure they celebrate or even know anything about Halloween. That’s one of the things I’m really looking forward to, teaching them all about our traditions and learning theirs,” I answered, handing a skeleton and a witch each a candy bar.

Sitting in the waiting room the following day while Bev was having her procedure was nerve-wracking. It was weird. Bev was more anxious leading up to today, but I woke up this morning with a feeling that something was going to go wrong. Of course, I didn’t mention anything to Bev and just tried to be comforting. But she was confident and didn’t need reassurance. When they called her, I squeezed her hand, which must have given my anxiety away.

She looked me in the eye and said “I’ll be fine, don’t worry.”

I guess we’d been married long enough that she knew what I was thinking. I tried reading the magazines, struck up a conversation with another guy whose wife was having the same procedure, and even took out my phone and started playing solitaire, but my anxiety didn’t wane until they finally led me to her room where she was lightly sleeping and assured me she was fine. She’d had a light sedative and had fallen asleep as soon as the procedure was over. As we headed home, my feeling of dread finally started to dissipate.

“I think it’s time to tell our families,” Bev said during the trip. “I wanted to wait until we had final confirmation, but things are looking so sure with Bujen and Langi, I’m ready to share our news.”

“Why don’t we have everyone over for Thanksgiving and tell them all at once. We might have a firm pickup date by then, and you may be pregnant.”

“I’m not sure I can wait that long to tell Rita. Let’s have them over for dinner this weekend. I just love holding little Billy; I can only imagine how much joy it will be with our own.”

“Hi Mom,” I began after calling that night. “How’s everything?”

“I’m glad you called, I was going to call you tomorrow. Your dad’s not doing too well. He came down with a fever a couple days ago, and we just got back from the doctor. He’s got the flu. I don’t understand it; we both got shots last month.”

“What did the doctor say?”

“Same old, lots of fluid, rest, and ibuprofen to keep the fever down.”

“Can he talk?”

“He’s sleeping now, but I’ll have him call you tomorrow when he’s feeling a little stronger.”

“I wanted to invite you to Thanksgiving dinner. Come for the long weekend. We’re inviting Bev’s parents too, so it’ll be a big group.”

“We’d love to see you both. I’m sure your father will be feeling better by then.”

But as the holiday’s approached, Dad wasn’t doing much better. He developed a lingering cough, and his energy level hadn’t returned. Two weeks before Thanksgiving, Mom called back.

“He’s got pneumonia. That darn cough went to his lungs. He started on an antibiotic today, so it doesn’t look like we’ll be able to make it over for turkey this year.”

“I’m getting worried, Mom. He’s been sick for too long. Bev and I will come over this weekend and stay in a hotel so you won’t have extra work on your hands. Just concentrate on getting Dad better.”

We flew into Columbus Saturday morning, and made the hour plus drive north to Galion, arriving at lunch time. Mom and Dad still lived in the house I’d grown up in, a three-bedroom, older house near the center of town. Dad had done factory work all his life, retiring at sixty-five, almost ten years ago. Mom had pastrami sandwiches and potato salad ready when we got there. Over lunch we listened as Mom described his litany of recent health problems, endless doctor visits, and growing list of medications. I had to admit he looked terrible, not the robust man I knew growing up, but now frail with a weak voice and a nearly non-stop cough.

“It’s getting so I don’t even like getting out of bed in the morning. I can’t do anything productive. I just sit in front of the TV and watch your mother do the chores.”

“That’s only been the last couple months,” Mom said. “Before that you were always good to help me, and keeping up this old house has kept you busy since retirement.”

“Maybe it’s time to start looking for something with no maintenance, a condo or senior living facility,” I suggested.

“Your brother has started looking around for options, but we need to see how much Dad recovers before we make a final decision.”

“We’re going over to Justin’s tomorrow. I’ll talk with him about what he’s looked at so far. I don’t think you should wait too long to make a decision. I’ll come back and help clean out things and pack.”

Then I took Bev’s hand and said, “We have some news. We’re adopting two wonderful children from the Marshall Islands, Langi and Bujen. We’ll be picking them up over the Christmas holidays. Bev and I couldn’t be happier.”

“But that’s not all,” Bev added. “I’m pregnant. The IVF was successful, and they implanted embryos a few weeks ago. My due date is early July.”

We spent the rest of the afternoon talking with Mom about all the details, while Dad went down for a nap, coughing all the while.

After church on Sunday, we went over to my brother’s to give them the news. Justin had stayed in town after high school and became the neighborhood postman. He married his high school sweetheart, Rose, and had three kids; Adam, the youngest at seven, then Jacob, ten, and Paula, twelve. We didn’t see each other much, just when we get back for the holidays. They usually had everyone over for Christmas Eve dinner and we exchanged gifts. They’d gotten a standing invitation to visit us but haven’t found the time with their busy lives.

“That’s great,” they said in unison after our announcement. “Three at once! I’m glad ours were spaced apart. But you’re both so organized, it’ll be a breeze, especially since two are a bit older.”

“We have started thinking through some of the logistics, taking leave, changing work hours,” Bev responded. “We’ll have Bujen and Langi for several months before the baby comes, so we want to make the most of that time, knowing the baby will take lots of time away from them.”

“What do you think of Dad’s health?” I asked Justin while we watched Adam and Jacob playing a video game.

“I don’t like that cough one bit. You can hear him rattle from across the room.”

“Hopefully the antibiotics do the trick.”

“He’s been on them for a week, but we haven’t see much improvement. I’m going with them for his appointment on Wednesday; I’ll let you know what they say.”

“They told me you’ve been looking at some places for them to downsize into.”

“Would you like to go see them? I’ve got two spots in mind. One’s a condo in a brand-new development, no maintenance, and only a couple miles from here, so we’ll be close. The other is a nearby assisted living facility just in case dad isn’t able to be independent much longer.”

“Hard to believe that can be happening; he’s been one of the most independent people I’ve ever known.”

“Me too. Just this spring, he put a new roof on the house.”

We spent the remainder of the afternoon checking out both places then headed back to catch a flight home.

“I think assisted living is the best option,” Bev weighed in while waiting for our flight. “He’s lost so much strength, it’s hard to imagine he’ll be able to recover enough to stay independent. And the next time he has a setback, they’ll have to move there anyway.”

“I was surprised when he didn’t fight the very idea of looking. He may realize how much help he needs and doesn’t want to burden Mom and Justin’s family.”

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At work, all the projects had been kicked off, so I'd begun meeting daily with a different team to help resolve any issues and keep them moving forward. Monday was forestation.

"Our initial problem was with the software that showed where to plant. It wasn't bringing in all the existing structures and land uses, like swimming pools and farming acreage. We debugged the program, and it's been working better," Derek began. "The latest issue has been documentation of when trees have been planted, especially on private properties. We get tree-sale records and match them with the website where a home owner records when he's planted, but they're off by almost 25 percent."

"You could have local centers survey their area to see if they can discover why there's shortfall," I suggested.

"Good idea, we can contact centers from different regions and get a good representative sampling."

"I have a neighbor who's been growing his trees from walnuts, acorns and maple seedlings. Is there a way for the website to capture those since they don't purchase anything?"

"Yes, there's a separate box to check," answered Ben, who handled the website.

"What percent of home owners are doing this?"

"Eighteen," he said after a quick check.

"We'll have the centers add that question to see if it matches," Derek added.

"So how are we doing to our target?"

"Businesses are doing terrific, mostly supported by their workers. Public lands are right on target, but agriculture lands, ranches and farms, are struggling. Planting crops often corresponds to the best time to plant trees. There's so much available land, but it's been hard getting enough volunteers signed up."

"Maybe we should focus on ranches first since they don't do crops and have a much higher percentage of their land that can support trees. That way they won't be competing for volunteers. Plus the data shows healthier pastures once trees have been interplanted."

“In total, after our first year, plantings are slightly ahead of schedule. But I’m worried that once business plantings drop off, the others may not pick up the slack,” Derek said.

On Wednesday, I met with Cal and the fertility team.

“The DoA has been doing a great job promoting the use of biochar,” he began. “Demand has been so high, supply has been our issue.”

“Getting the wood or processing it?” I asked.

“Both,” he explained. “It took a while to set up home pickups, but now pickups are in half of places where there’s recycling, and it’s on track for ¾ by spring. Our other focus has been working with federal and state forestries to use their cuttings. That has taken so much of our team, we haven’t done much with tree-cutting crews and other businesses that create scraps.”

Chet, who was in charge of processing, reviewed that status.

“More pyrolysis plants have begun opening up. It took a while for them to get licensed, built, and inspected. There’s still a backlog since demand has risen, and many more want to get into the business. Our biggest factory shortfall is in rural sites, there’s plenty of wood and vegetation scraps, but a shortage of workers to build and run the facilities.”

“Could our rural centers work as a go-between; have them put on job fairs for companies looking to build in the area?”

“That should help, we’ll contact them.”

“Aided by the desert trial acreage, we’re well ahead of target on usage,” Cal summarized. ”I’m really hopeful we’re going to significantly exceed our target. There’s just so much demand, it’s a question of getting the facilities built quickly enough.”

Friday was my appointment with Jennifer to talk about my upcoming FMLA.

“We pick the kids up over the holidays, then I’ll start my three months leave. I’ve been having weekly meetings with my staff to handle my absence; they’ll do fine,” I began.

“I’m sure you’ll get them fully prepared. I’ll be sitting in for you on staff meetings, so I’ll make sure things keep moving forward too,” she responded. “But I have a proposal for you. As you know, we’re behind on the brine processing project, not having enough staff to work on it yet. If you're game, I'd like to put you on special assignment so that you could work on this project during any downtime you might have. Just do as much as you're able. When you come back, we should have staff freed up from other projects to take it from there."

"I'm sure they'll be some downtime after the kids' bedtime. All the fees have made a huge dent in our savings, so the pay would be welcomed. I'll need to discuss it with Bev, and let you know next week."

That night over dinner we discussed the offer. "We'd need to set some ground rules. I won't let you neglect our new children with your old work habits."

"No chance. I was thinking maybe an hour before they get up in the morning and another after they're in bed. And possibly some while Langi is doing homework. I thought Bujen could be at the homework table either reading or drawing, something like that. But I wouldn't start that unless we both think it'll work."

"Okay, but I'm going to keep a close eye on you, so don't backslide," Bev reiterated.

The following week I met with more of the carbon capture teams, the first being kelp farming.

"Our primary focus to date has been getting processes in place to drive up demand," Gabriel began. "First, by setting up the process with the FDA to certify cattle ranches that use it as a feed supplement. It's due out January. We've also been focusing on the largest fast food chains to use it in their herds. Recently we've begun working with existing farms on expansion plans, sharing our demand projections."

"We want the teams to work with the centers wherever possible. Perhaps the coastal ones could reach out to likely businesses that may be interested and host seminars on the steps to starting a farm and getting the proper licensing."

Shaun spoke next. "I've been leading the effort for increasing usage in fertilizers. It's one of the low-cost components, so once I show the benefits, most fertilizer manufacturers have been quick to investigate increasing its percentage."

"I've been thinking about how to work the demand side, not just relying on manufacturers to change without customers asking for it. You've got an advertising budget, how about you look into doing some national spots promoting its benefits?" I suggested.

The following day, I met with the phytoplankton group.

"This project almost runs itself," Suzette began. "We show videos of the existing platforms bobbing in the ocean, surrounded by all manner of marine life, and the only question fisheries ask is where they can get them."

"So what's your biggest issue?"

"Maintenance. So much gunk gets built up on all the moving parts, the platforms need to be taken out of service every few months."

"Our desalination team is having success with graphene in a similar environment, it's impervious to cleaning solutions so maintenance is much faster. Perhaps if the structure was coated with it or something similar, it could be cleaned in place."

After the team left, I sat at my desk thinking through all the projects, scanning their summary sheets. In just the year since the president began making announcements, we were well on our way to meeting our target. Sure, it was still early going, and no doubt there'd be challenges along the way, but we hadn't hit any big snags. I pulled out my phone and called Bev, "I feel like celebrating tonight, let's go to our favorite seafood place."

Chapter 25

My mom and dad arrived on Wednesday night after driving all day from Pittsburgh. Over decaf and dessert, we told them all about Langi and Bujen.

"That's great news," Dad said after Joe and I took turns describing them.

"I'm so happy for you both," Mom added. "It's wonderful you talk to them so often. You'll already know so much about them when you pick them up."

"There's more," I said, lifting up my blouse to show off my bump.

"Oh my god, you're expecting! My prayers have been answered," Mom cried, breaking into tears and rushing over to hug me with Dad at her heels.

After the hugs, I said, "I want to show you Bujen and Langi's room; we've had it ready for a month. We'll change the other bedroom into a nursery after Thanksgiving. We've got plenty of time."

"We'll move here once I talk your dad into retirement. With all our grandkids here, I won't be able to stay away. I'm sure you could use some help with three kids."

"When is the big day, Dad?"

"I've started thinking about it. I'll be sixty-five in January, so it's probably about time. It's a little scary when you've worked all your adult life. I'm not sure what it'll feel like not going off to work in the mornings."

"I keep telling him it'll be as easy for him as it was for me when I retired from nursing. I never looked back and began doing all the things I'd always wanted to do. And with four grandkids to help with, there'll be plenty to do."

After Dad and Joe went to bed, Mom and I stayed up to chat more.

"How was the procedure?" she asked.

"At times a little painful, usually cold and impersonal, but I don't care, I'm pregnant," I nearly shouted with joy.

Then Mom began telling me about the things to expect with my pregnancy, which ended with our warmest hug in years.

Rita, Lucas, and Billy came over the next afternoon. Rita helped Joe and I finish getting the food ready while Mom and Dad took turns holding Billy.

“Let me watch; I’m going to be nursing,” I said when Rita got up to feed the baby.

“It’s been easy. The nurses showed me when he was born, and he took right to it. Just a little nipple soreness and lots of leaks, but he’s so peaceful when he nurses. He falls asleep on one side, but I just move him to the other, and he sucks in his sleep. It’s amazing.”

“Yep, he’s out cold,” I said after a few minutes.

Dinner would have been great except for worrying about Joe’s dad. We started off dinner with a prayer for him. I could tell Joe was preoccupied; he’d been calling daily since they admitted his dad into the hospital after his follow-up appointment. Joe was leaving in the morning for another visit while I stayed with my mom and dad.

Joe called me Sunday after my parent’s had left. “He’s finally kicked his fever and is breathing better, so he’s going home tomorrow. I feel so much better, like a weight has been lifted. Mom has been here non-stop and finally let Justin take her home to get some sleep. I’m going to stay here tonight and take him home tomorrow.”

“That’s such a relief,” I said.

“He’s still very weak; this has really set him back. He’s going to go to rehab to try and get some strength back. He needs a walker for a few weeks to make sure he doesn’t fall.”

“Do they think he’ll get his strength back?”

“They say it all depends on him, how hard he works at it. I’d like to stay a few more days and take him to rehab to see how he does. Maybe with all of us pushing him, he’ll make good strides.”

“How has he accepted the assisted living decision your mom made?”

“Pretty well, but he doesn’t want Justin and I to do the moving work; he says they have plenty of money to have it done professionally. We both have families that need us with them.”

“That’s pretty terrific. Give him a big hug for me.”

By mid-December, morning sickness had begun in earnest, much worse than how Mom described hers. I’d feel nauseous soon after waking, and it would only start to dissipate after nibbling saltines with small sips of apple juice. Joe couldn't even make toast; any cooking smell would set it off. I found that small snacks throughout the day usually got me through work without vomiting, but not always. I kept mouthwash, toothbrush, and a spare blouse at my desk for those occasions. But the nausea would come roaring back in the evening, often accompanied by vomiting. I didn't want to take anything for it and take any additional risks for the baby, so I tried to just get through it.

We were scheduled to leave on the twentieth to pick up the kids, and I was miserable. How would I be able to handle flying for almost two days? We reserved seats pretty close to the toilet, with me on the aisle, but smells were a trigger, so we had to make them far enough away that I wouldn't get sick every time someone opened the door. We'd gotten extra barf bags ahead of time along with a water bottle, saltines, and a small trash container that kept smells down. My doctor prescribed me something that I'd take only in an emergency, even though she assured me it wouldn't harm my baby.

A couple of days before leaving, we had an ultrasound and were overjoyed to hear the baby's heartbeat, and see a third leg confirming another Lil Joe. We hadn't decided on Joe junior, but I liked it. Joe wasn't so sure and wanted to think about it more before committing. The doctor gave us the ultrasound picture, which we hung next to pictures of Bujen and Langi.

Later that day, Taps sounded, but I was on the phone to one of the desert teams and couldn't leave right away. I texted Amy I'd be late and to get me a hot chocolate, knowing how cold it was.

"This is the latest you've ever been," she said when I finally got there. "Everything alright?"

"No, we're having problems with the irrigation. Leaky connections are giving our teams fits."

"Where are the leaks coming from?"

"The connection to the irrigation machine. They seal fine at the start, but within a week they start leaking. It really messes up the variable irrigation, which is at the heart of maintaining the desert environment. The seal manufacturer has investigated, but said the joint is looser than it's supposed to be, and their seal can't work without it being tighter."

"Can't they just put in a larger seal to take up the slack?" Amy asked.

"They don't have one that size; it's not a standard. They've tried lots of places, but no one has it, and it'll take weeks to make the larger one."

"If the leaks are fairly consistent, could you reprogram the irrigation pump to compensate?"

"There's an idea. I'll run that by the team when I get back."

"Enough about work; how are you feeling today?"

"I haven't vomited today, but my mind's a jumbled mess. I'm super excited to finally pick them up, but I'm so anxious about the trip, knowing I'll likely be miserable the whole time."

"Do you have something to help you sleep? That's what I do on long flights."

"Only if I can't stand it anymore. I know I'm being paranoid, but it was so tough getting pregnant, I don't want to do anything to jeopardize it. I've packed lots of books, puzzles, and music to help take my mind off it."

"How's Joe feeling about being with them full time, is he nervous?"

"A little, he's never been around kids, so this'll be a crash course. But he's excited too and got them all kinds of stuff: computer tablets with games and tutorials on reading, geography, and arithmetic. We filled their bookcase with all the standards, plus blocks, an erector set, and even a kid's chemistry set."

When we returned, I looked at the website and saw today's Taps was different than the usual, it was a year-end summary of the on-going drought in the southwest. I tried thinking about Bujen and Langi to help get my mind off the devastating losses that farmers and ranchers were suffering.

While boarding the following morning, I literally had to run to the ladies' room. Joe was explaining the situation to the flight attendant while he waited for me, and we arrived last to our seats, slightly red-faced. But the last-minute vomit seemed to help, and along with drinking plenty of water and munching on saltines, we made it to San Francisco without another instance. By now I was hungry, so I had a big lunch, and then we strolled the terminal till our flight to Honolulu boarded. I was too anxious and uncomfortable to sleep, but Joe was out like a light. I read a book, flipped through the seat magazine, and made small talk with a friendly lady across the aisle. When the attendant brought dinner, Joe finally woke up and we chatted into the night. I was finally able to doze a little toward the end, but awoke soon after when the pilot announced he was starting his approach. *Who cares, just do it*, I thought sleepily.

Our next leg wasn't until the following day, so we'd booked a room in the adjoining hotel. Our biological clocks said it was the middle of the night, but it was just evening in Honolulu, so we decided to take advantage of being in Hawaii to walk the beach before retiring. We changed to beach-walking attire, caught a cab, and were strolling hand in hand inside of an hour. Walking and seeing the setting sun finally made my anxiety go away, and I slept well when we returned.

The following morning my nausea was back with a vengeance. I vomited several times before we left the hotel and then again at the airport. But I was okay during the flight and watched a movie for most of the leg to New Guinea. It was a quick layover, and I took the window seat this time to watch for the island, Joe peering over my shoulder. I spied it first and felt a wave of relief flow over my body— we were nearly there. We circled the airport and touched down on the narrow runway that I still found ominous. We came to a stop and waited for the stairs to drop. Then we hurried down, and I half walked, half waddled to the gate, watching for their faces as we went. We both saw them at the same time, and we shouted and waved. When we hugged, I didn't let loose for several minutes, just looking at them, smiling through my tears. As we drove to the orphanage, I couldn't stop watching them the whole way. I remembered to ask Langidrik if we could call him Langi since we'd gotten used to it, and he agreed, saying he liked it better anyway.

It was only two days till Christmas and there was lots to do. Our first day was spent getting all the paperwork done and meeting with officials. It was our last paperwork signing, and once done, we both hugged Bujen and Langi, telling them they were ours now, forever.

"Let's go get ice cream to celebrate," Oscar said when we finally broke. "My treat."

That night, I asked Bujen if she wanted to sleep in my cot and I'd join her when I came to bed.

"I'd like that," she said quietly, and my heart about burst.

"How about you, Son?" Joe asked Langi.

"Is there enough room?"

"I'll push two cots together. That should do the trick."

The next day was final rehearsals for their singing and dancing skits and putting finishing touches on their outfits. The kids looked and sounded amazing. I could hardly wait for tomorrow's performances.

After services the next day, we watched as many exchanged large baskets of food. Oscar explained this was part of the celebration and that the food had been collected for months. Several came by and handed a child something.

"Look, a doughnut!" Langi exclaimed, thanking his giver.

"I got some breadfruit," Bujen said, showing her gift.

A while later, seated in the auditorium, we heard the music begin. The first to enter was a group of men. Dressed in bright-yellow patterned shirts with orange flowers and shell necklaces, they came out in unison, keeping step to the music. Dozens danced out, all shapes and sizes, nothing flamboyant, just rhythmic stepping. Next came the women, dressed in beautiful ocean blue, white-flowered gowns and beaded headbands holding their hair back. As they paraded in, the singing began. It was a beautiful Marshallese melody that they swayed to as they passed before us. Forming a circle, the music became livelier and the singing faster. The choreographed dance steps matched the beat, with everyone smiling as they danced. Several more dances followed, and then they came their last number. It was slower, accompanied by drums and piano, with their movements more subdued, almost sensual. During the number, several audience members rushed out and grabbed the necklaces, bracelets, and headbands of the singers then returned to their seats.

"What are they doing?" I asked Oscar.

"Showing how much they liked the performance and costumes."

After the next act, Oscar took the children backstage to get their costumes on.

When they came out, I was mesmerized. The boys were wearing light-blue shirts with tan slacks and homemade jewelry: necklaces, bracelets, and rings. The girls had yellow and white striped skirts with emerald-green tops with even more elaborate adornments.

“There’s Langi,” Joe said, grabbing my arm. “Look at him go.”

He was really getting into the music. As opposed to the adults, the kids came in freestyle, doing whatever moves they felt from the music.

Soon I spotted Bujen. “She looks a little scared, where’s her smile?” I whispered.

When she spied me, I gave her my biggest grin and waved. This got a smile out of her, and she started moving more.

After they entered, they lined up, boys on one side, girls on the other, and did their practiced routine, forming smaller groups in between, doing traditional Marshallese dances.

Next they sang songs, beautiful homages as they swayed back and forth.

“I’m going to ask them to translate for me when we get home,” I whispered to Joe as they left the stage. “I want to know what they’re singing about.”

The final performance was a dance around an object that Oscar called a wojke. At the conclusion of the dance, the dancers broke it, with money, toys, and gifts spilling out. Bujen and Langi rushed the stage to get their share of the goodies.

After the performances, there was a pig roast, which had been cooking since last night, with rice, breadfruit, coconuts, bananas, and rolls accompanying it. As we ate, several people introduced themselves and told us of their relationship to Bujen and Langi: friends of their parents, former neighbors, and parents of classmates. All wished us the best, thanked us for providing them a home, and gave them hugs as they left.

That night after the kids went to bed, we talked with Oscar.

“We’ll be down to fifteen after Bujen and Langi, with several others in the works. Barring another major storm, by summer they’ll all be placed. Thanks to your group and others like you, my dream for the kids to have loving families and hope for a safer life will come true.”

“What will you do then?” I asked.

“UNICEF has been talking with Micronesia, there are hundreds of other islands with many of the same issues as the Marshallese. I’ll probably be stationed in their capital, Palikir.”

The following night was a party for Bujen and Langi, similar to Dilini’s. All manner of seafood along with local fruit and vegetable dishes were brought by islanders, saying their farewells. Watching them with their friends and neighbors, I knew how hard it would be to duplicate so much love and goodwill back home, but Joe and I vowed to each other, we’d try. Oscar drove us to the airport the next morning, where we hugged for a long time before we left. I didn’t know when we’d see him again, but we’d still be in regular contact till the adoptions ended. Maybe, I thought, we could keep our group going for his next group of islands.

Chapter 26

I heard Langi from my bed. I glanced at the clock, 4:15, his best waking time yet. The sixteen hour time change coming from Majura had been hard for everyone to get used to. We'd brought along things to do: coloring, reading, and games, but after a few hours they got bored, just needing to move. We walked the aisles, trying not to disturb the other passengers until they turned the lights down to match the outside darkness. That helped them fall asleep, but it was restless with many interruptions. When we got home, their difficulty adjusting continued. They'd outgrown naps on the island, but once here, we found a short one after lunch helped. This kept them going till after dinner and bath time when we'd put them down for the night. Bev took the week off work and got up with them, but her week was over, and now it was my turn.

It was also Langi's first day at his school. We'd registered him weeks ago and had talked with his upcoming first-grade teacher Mrs. Palsinger, fiftyish with glasses, greying hair, and a welcoming smile. She had described the activities he'd be doing, everything from acting out vocabulary words and counting items, to drawing geometric shapes. We'd also met with the Reed's, Shirley and Mike, our neighbors to the east, with two older kids at the same school. Kayla was in third grade, Billy in the sixth. They told us more about the school and showed us where the bus picked up and dropped off.

I had put on coffee and packed his lunch, reminding him what his first day would be like while he colored at the kitchen table. Bujen slept till six and Bev came in a few minutes later to hold her with her starter cup of coffee. I was grateful her morning sickness had finally ended. She was much more comfortable, and it was so much easier not having to avoid the many smells that triggered it.

"I'm going to need to hit the maternity stores soon; my work clothes just barely fit," Bev said with a frown, coming back into the kitchen after getting ready.

She left with a huge hug for them both, extending Langi's with extra words of encouragement. Then the kids ate, got dressed, and we all walked to the bus stop. Coming from a tropical climate, winter was proving a challenge for them. Coats, hats, and gloves proved insufficient as they both began shivering before the bus arrived. They both huddled inside my coat for extra warmth, and we all rejoiced when we finally saw the bus approaching. I carried Bujen back home, wrapped in my coat; it was my turn to shiver. First thing on the agenda, finding a store with warmer apparel.

After returning with thermal underwear and thickly lined coats for the kids, we worked on materials that Mrs. Palsinger had given us to help Bujen prepare for kindergarten in the fall. We concentrated on vocabulary, her weak point due to her shyness. She was a wiz at counting and quickly got to a hundred, so I started her counting by two's. Soon it was time to meet Langi at the bus stop, warmer coat in hand. He was excited to talk about his first day, the friends he made, and how nice Mrs. Palsinger and her helper, Miss Angela were.

"What things did you learn?" I asked the question of nearly every parent since schooling began.

"Nothing much, I mostly knew the stuff they talked about. The vocabulary words and counting games were easy. They showed us a global map, and Miss Angela had everyone from another country like me, show where our country is and tell something about it."

"What did you tell them about yours?"

"Its warm weather and the blue ocean surrounding everything."

Bev came home earlier than usual, wanting to hear about our day. She was most relieved to see that Langi wasn't behind in school. Oscar and his helpers had somehow kept up on the kids' education even as they struggled just seeing to their basic needs.

"I met a new playmate," Bujen told her.

"That's terrific, who?"

"Her name is Gwen. Daddy and I are going to her house tomorrow to play. There will be another girl there too."

"Kirsten", I reminded her. I explained how we'd met Gwen and her mom at the bus stop and had been invited over. "I told them I'd bring a treat for a mid-morning snack, so I've got a coffee cake in the oven."

"I can't wait to hear all about it tomorrow."

“This is tough,” Bev said that evening, after we’d put them to bed. “I’m jealous you’re getting to spend so much time with them. I nearly cried when Bujen told me about tomorrow; I want to be there so much.”

“I’ll take video of them playing together.”

“Send it right away; don’t wait.”

The next night Bev told me “Bujen looked so happy playing house with Gwen and Kirsten. I watched it over and over again.”

“It went so well we’re going to meet twice a week, alternating houses. Our turn is Friday.”

“I’m staying home, I want to be there too.”

But on Thursday afternoon, I got a call from Bev.

“I started bleeding, and it’s heavy. I called the doctor, and she said to come right in. Can you meet me there?”

I could hear the despair in her voice. “Langi’s bus gets here in just a few minutes; I’ll call Shirley to see if she can keep the kids. I love you.”

By the time I got there, her doctor had confirmed the miscarriage.

“I shouldn’t have gone back to work. All I did was think about Bujen and Langi while I was there. I probably caused it,” she said in between sobs.

“The doctor says it’s fairly common. Don’t blame yourself,” I whispered, hugging her.

“I really got my hopes up at the ultrasound, seeing his arms and legs moving.”

“Hearing his heartbeat did it for me,” I said, starting to tear up.

“How do we tell the kids? They’ve been so excited about getting a baby brother.”

“We’ll think of something.”

It was after dinner by the time we got home, and after helping Bev to bed, I immediately went next door to get the kids. We all gathered in the bedroom around Bev.

“There’s not going to be a little brother, at least for now,” Bev told them perched up on pillows, maintaining her composure. “But we still have each other, and we’ll be okay.”

The next several days were rough, trying to maintain composure around the kids while grieving internally. Bev was up more each day, and by Monday she was mostly back to her normal activity. We held each other more, and I found myself often thinking about Joe junior, wondering what his life would have been like. *What color would his hair and eyes have been? Would his personality have been more like mine or Bev's?*

"Do you think about him too?" I asked Bev after telling her some of my latest wonderings.

"All the time— mostly about the infant things we missed with Bujen and Langi: nursing, changing his diaper, and watching him roll over. I hear him cry so vividly, I go look around the corner for him."

"Now you've done it. I haven't cried all day." I wiped a tear from my eye.

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"How about we go for muffins and hot chocolate?" I said on Tuesday after we got Langi on the bus.

"I want blueberry," Bujen yelled above the roar of the engine.

"When I called into work this morning, I told them I'd probably be ready to come in next week," Bev said, sipping her cocoa.

"You don't need to rush. Are you sure you'll be ready?"

"Physically I'm okay, but emotionally I'm still trying to deal with things. Maybe it'll help to get back to my routine, but I want to make the most of the week with the kids."

Being around Bujen and Langi helped get us through the grieving process. They must have sensed our sadness, as they often staged puppet shows, which always put us in a happy mood. They usually had an ocean theme. Bev and I would frequently join in, Bev playing a beautiful mermaid while I was the mean ship captain trying to catch her. They took turns saving her while the other would banish me from their kingdom. Friday we hosted the play date with Gwen, Kirsten and their moms. I watched Bev interact with everyone, knowing she was healing quickly.

The week after Bev returned to work, I began working from home after the kids went to sleep. A few weeks later, I started getting up early to do some more. My task was to detail the steps to process desalination brine, the high salt leftovers from the reverse osmosis process. We couldn't just return it to the ocean; the quantities we were planning would be harmful, adding to the effects of acidification and warming already causing so many issues. I began by conducting an in-depth study of the four processes we planned to use on the brine.

The first process was to react the brine with carbon dioxide in the presence of ammonia gas to produce sodium bicarbonate and ammonium chloride. Carbon dioxide would come from air collectors we'd locate nearby. The ammonia gas would be a by-product of the second process we'd be doing: reacting the ammonium chloride with calcium oxide, which would also generate calcium chloride. The third was so common it had a name, the Solvay process, producing sodium bicarbonate. The last brine process used electrolysis to produce the hydrogen needed to make synthetic fuel. The hydrogen would be combined with carbon monoxide to make the amount of synthetic fuel necessary to ultimately replace petroleum.

The primary requirements I had to balance were to bring the brine saline down to normal levels, produce enough hydrogen for synthetic fuel, and maximize revenue from the industrial products. Already knowing how much synthetic fuel I needed, it was straightforward to calculate how much hydrogen to produce. Calculating the amount of the other industrial products was a matter of estimating their production costs and comparing to their market value. Maximizing return enabled me to calculate how much to produce of each.

This was getting my engineering juices flowing again, and I had to resist the strong urge to shirk some of my parenting duties to work longer hours. *There'd be time to finish the calculations once my leave ended,* I kept telling myself, *take advantage of the time now with my kids. I may never get it again.*

"Promise me you'll call me out if I start working too much," I told Bev after a few weeks.

"I'll do more than call you out! Don't you dare!" She nearly screamed at me.

I kept myself at bay by presetting an alarm and giving it to Bev to come get me when it rang.

A few weeks later, Bev brought up the question that still needed answering. "Should we do another round of IVF?"

"I've been thinking about this for a while now," I answered. "My vote is no. I don't want you going through the procedure again and the thought of another miscarriage haunts me. Before Bujen and Langi got here, I wasn't sure how I'd feel, but if this isn't fatherhood, I don't know what is. I worried I'd be bored doing mundane parenting things over and over, but it hasn't been that way. I love watching them learn and grow. It's already happened in the short time they've been here, and I love being part of it."

"I'm fully satisfied with our family too; I can't wait to start my leave and be with them more. I don't have that maternal ache telling me to bear a child of our own; I know they're ours."

Bev called me from work a few days later, "How would you like to take the kids to Mexico over their spring break? They're doing final trials on the Jatropha-harvesting machinery in one of their groves. I'd love to see it, plus Antonio invited us to dine with them so our kids could get to know his. Since it's my last week before I go on leave, it would feel like I'm starting early since I'd be with Langi and Bujen."

"Sounds like a no-brainer."

In late March, we boarded the plane to Mexico City, excited to see the harvesting machinery and introduce the kids to Antonio's family. The flight was so much shorter than their trip to the States, and they handled it like veterans. We dined at Antonio's home that evening. The kids were about the same ages, so after dinner, Pablo took Langi to play in his room and Juanita brought out her favorite toys for Bujen and her to play with. Pablo and Juanita knew a little English, and for the rest, they used hand gestures and pointing to get their message across.

"How did your leave go?" Alejandra asked, helping Juanita re-dress one of the dolls.

"Indescribably well. I was nervous at first, but it didn't take long to settle in. I love taking the kids places to learn our culture and to see and do the things they've not had the opportunity of doing. They loved going to the library, seeing all the books and participating in the programs. They didn't like going into downtown much, only to the memorials. They said there was too much concrete and not enough trees. We're planning to start in on the museums this summer."

"Bev told me you've also been working on the brine reprocessing details," Antonio said.

"Mostly at nights. Bev's helped keep me from going overboard on how much time I put in. But I've been able to create procedures for the processes we'll be using. I just finished the cost work before we left, start-up costs and how long till their payback at the current commodity prices."

"I'd love to see them; would that be possible?"

"That's always been the plan, I just need to review them with the team first. I'd love your team to double check my calculations and make sure I didn't screw up."

"How's your desert project coming?" I asked him. "That's one thing I miss about being in the office; I don't get to hear how everything is progressing."

"Bev's counterpart, Sophia, keeps us on track. We've recently started enclosing the tidal lagoon and have contracted the company that's building the desalination plant. Digging starts in a few months for the irrigation ditches that run to the border. She's been bugging me about the brine reprocessing, so I'm counting on your plans to get her off my back."

"You thought I was thorough, but you've never seen anyone like her," Bev said, looking at me. "I'm looking forward to meeting her tomorrow."

"Did you go to last month's international meetings?" I asked Antonio.

"Unfortunately."

"Why's that?"

"Not a very good story. Lots of countries falling behind on their commitments already."

"Damn. Did they start talking about implementing the treaty fines to put a fire under them?"

"They gave them till next year to get back on track, and then the fines would begin."

After a several-hour ride to the Jatropha orchard the next day, the harvesting machines were already in action. Having been an integral part of the design team, I often found myself explaining its intricacies. The heart of the machine was the paddle arms that knocked nuts from the branches. They extended from knee high to fifteen feet tall, and they vibrated, using a combination of spacing, hardness, and flexibility to knock off the ripe nuts while allowing the unripe to pass through. Ripe ones dropped onto a conveyor belt where they were chain driven to a second station and laser sorted by size to keep the most desirable. Lastly, they went through a scanner for color. The rejects dropped to the ground to use as fertilizer for next year’s crop, while the selected continue to the bed of the truck to package for eventual shipment to the refinery.

This was one of the quirks of Jatropha; the nuts ripened over several weeks, so to get the largest quantity of oil, harvesting at the right time was essential. Studies had to be done to see how much force and vibration would knock off only ripe nuts, followed by experimentation with materials, geometry, and vibration levels to achieve the forces.

The machines moved at a walking pace, so we took Bujen and Langi down several rows, watching the harvest and seeing the rejects fall to the ground. Per spec, we saw virtually no branches torn off during the harvest. We followed the machine till its bed was full, and then watched as it dumped its load onto a truck for transport to a nearby town. Examining the nuts, they looked uniform in size and color. When we got back, we met Sophia, examining some of the data from the trial.

“The machines are running great,” I said after introductions. “How does the data look?”

“These are last week’s results: size, color, and density of the nuts are right in line with their specs, but the last chart is what really excites me, the oil quantity per nut. It’s higher than last year’s due to making the soil more nutritious. After last year’s harvest, we amended it with manure, cover crop residue, biochar, kelp, and remains from last year’s seed cake after the oil was removed.”

“I can’t wait to see results from our trial hybrids,” Bev added while I gave the kids a snack. “With so many different varieties, I bet we’ll see another big jump in oil quantity.”

“Did you do carbon capture studies on this grove?” I asked handing Bujen a granola bar.

“Yes, both wood growth and atmospheric measurements. Using nearby groves without the soil amendments as a baseline, carbon capture is up 20 percent.”

“That is what I’m excited about seeing with our trial; hopefully, we’ll see some varieties that do much better still.”

“How about the machines speed and uptime?” Bev asked. “These babies are costly, so we want them running almost all the time. Since we planted at different times, ripening will happen in stages, and there won’t be much downtime.”

“We’ve been running them at top speed much of the time with no issues so far. But it’s too soon to know their reliability, so we’re monitoring all the operating conditions and checking for leaks, wear, and other signs of fatigue at the end of each week. We’re going to use them all season on existing groves, so we’ll have some idea by the time our trial acreage is ready to harvest in the fall.”

We spent the night at a nearby inn, which had a pool for the kids to swim, and we returned the next morning to a steady rain.

“This will be a good test for the machines,” Bev said to Sophia. “It doesn’t rain much in our deserts, but when it does, these machines have to keep working.”

There wasn’t room in the machines for passengers, so we rode the adjacent rows in covered carts, watching for any problems. After a few hours, we stopped several machines, looking to see if the nuts still looked the right size and color. Using templates, we sized several then compared their color to charts.

“So far, so good.” Sophia smiled.

After an on-site lunch, we said our good-byes to Sophia and the rest of her team and returned to Mexico City in time for a farewell dinner with Antonio’s family. Afterward, they hung a piñata filled with candy and toys and blindfolded the kids one by one, who then took turns swinging until it broke, scattering its rewards.

The following morning we flew home, knowing I’d be starting back to work on Monday, and Bev would take over the reins at home. I’d had a great time being with the kids full time and was sorry it was ending so soon. I now knew what other parents meant when they complained that time went by too quickly.

Chapter 27

I couldn't believe my first day as a stay-at-home mom was finally here. I wanted to rush in and wake the kids early to hug them good morning. I was making pancakes when I heard Bujen come in.

"Good morning, sweetheart, sleep good?"

"I had a bad dream and woke Langi."

"What was it about?"

"I dreamt a typhoon hit Majura and killed some of my friends."

"Let's check a website that knows if there are typhoons anywhere in the world. Later we'll call Oscar after they're awake and make sure everyone's okay," I said putting down my spatula and reaching for my laptop. After a quick search I announced, "No typhoons anywhere."

"But I'm scared some of my friends will still be there when another hits. They're so terrible, I used to close my eyes and say a prayer, but I could still hear them. They'd last for hours, and all the kids would be screaming and crying the whole time."

"I'm so sorry," I said, reaching out to hold her. "When we talk to Oscar, we'll ask how many more have adoptions in the works. I know how many there are from our group, but I don't know how many from other groups."

Then I had an idea.

"How would you like to come to a meeting? The one you used to talk with us at? Do you think you could tell your story to others there? There's a lot of people who come, and it might help get some of your friends placed quicker."

"Would you hold my hand while I talked?"

"I wouldn't let go even if a typhoon hit."

Langi and Joe came into the kitchen together a little while later.

"Look who I found still under the covers," Joe said, reaching for the coffee.

"But my alarm hadn't gone off yet."

"Sorry, two whole minutes left. I just wanted to see you before I left."

“Sit down and have some juice; pancakes are almost ready. Pineapple and coconut just like you asked for.”

On Wednesday we showed up to the meeting early to get Bujen acquainted with the room, talking into a microphone, and standing next to the podium. Joe, Amy, and Brenda soon arrived, and we quickly set up the room. At home, she’d practiced her story several times until she was comfortable telling it. She practiced one more time before others arrived and had Brenda and Amy in tears. We took our seats near the front, gently talking to keep her from becoming anxious while everyone got settled. Joe spoke first.

“Thank you all for coming. Everyone knows the purpose of these meetings: helping to find safe and loving homes for Marshallese children who don’t have a safe home and whose parents have already been killed in storms that threaten this time of year. These two lovely women up front, Amy and my wife, Bev, began this endeavor almost two years ago when there were fifty children. There are nine remaining. I implore you to consider taking in one of these children. Bev and I took two, and it’s changed our lives in so many ways. Bujen is one of them, and she’s here seated next to Bev. She’s going to come up and tell you her story, but know that it’s similar to the ones already placed and the nine still remaining.”

I walked with Bujen to the stage, her hand squeezed tightly in mine.

“Lakwe, that’s hello in Marshallese. My name is Bujen. My brother Langi and I are from the Marshall Islands. Many wonderful people live there, but it’s become a hard life. Our coral is dying, making it hard to find enough fish to sell and eat. Tourists have stopped coming, so there are few jobs. Many homes and boats have been destroyed by storms, and now too many people have to live in unsafe places. Electricity doesn’t usually work, and the water often makes people sick. But the worst are the storms that kill people, like the one that killed my mom and dad.”

Bujen choked back her emotions and I whispered, “You’re doing great.” She continued after a couple failed attempts.

“I was too young to remember that storm, but I remember others, like the one that destroyed our orphanage. It wasn’t supposed to be very strong, so we stayed there instead of going somewhere safer. But it got stronger as it came closer, and we couldn’t get out in time. When we heard it, the kids all hid under our beds and started screaming and crying, but I could still heard the winds. Windows broke, and glass blew everywhere. Then everything went crazy; dishes, clothes, and furniture flew around the room. My best friend, Obet, was under the bed next to mine and got hit by glass and started bleeding. Another friend, Yasmine, got hit in the head by a chair. They both died along with others in the storms since. I don't want any more of my friends to die there. All of them need safe homes like the one Langi and I have now with our new mom and dad. Please help them."

Everyone in the room stood and clapped. Bujen began softly crying, and I picked her up whispering, "You were awesome." Still upset, I took her home, leaving Joe, Amy, and Brenda to finish the meeting.

When Joe got home later that evening, he called all of us together for his big news.

"All your friends are getting homes!"

"After each child spoke, a couple came up, introduced themselves, and said they wanted to be their new parents."

"That's so wonderful" I shouted, trying to be heard above Bujen and Langi's cheers.

"And guess who's taking one? Amy. The last child to speak, Raken. She said she'd been thinking about it all along, and it was now or never. You should have seen Oscar, he was overwhelmed with joy and couldn't explain the process. Brenda had to help him."

"There's going to be lots of Marshallese coming here," Langi said when he stopped cheering. "Can we have a party to welcome them?"

"The biggest one you've ever seen," I said.

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The weeks until summer break fell into a routine: fixing Joe and the kids' breakfast, walking Langi to the bus, and play dates or trips to the park. After lunch would be chores: cleaning, laundry, or shopping. When Joe got home, the three of us would fix dinner while Langi did homework.

After the kids went to bed, Joe would bring me up to date on any big happenings with the desert project. One day it would be irrigation ditch digging updates, another, status on graphene membrane swap outs. But throughout it all, he was closely monitoring the desert landscape as the trial progressed. He used weekly satellite pictures to compare to their baseline, taken prior to planting. Wildlife was more difficult to track; microphones and cameras were placed all over the area to record their movements and sounds over time. Added to this were sightings by park rangers, visitors, and our own staff who'd been trained to look for and document the wildlife. Large-scale seasonal migrations, animal herds, and those near urban areas were easy to monitor and count. The nocturnal, quiet ones not in big groups, were the most difficult.

Girls night out remained a regular getaway that I cherished. This week we were meeting at Fran's apartment to help her pack. She was moving in with Brad, a guy she'd met at the dog park where she walked Jimmy.

"Butch and Jimmy get along so well, we figured why not," she said when I asked her on the phone why she was moving in with another guy. I tried not to be judgmental, but couldn't help telling her how nutty this was.

"Plus my lease is up, and they're raising the rent," she said, as though I hadn't uttered a word.

"A far better reason." I laughed.

After boxing up Fran's stuff, we walked to a nearby pizza place to continue the conversations over beer, breadsticks, and deep-dish pepperoni. Even though I loved the kids with all my heart, I wanted to prolong the adults-only outing.

Soon after summer break began, Joe and I began discussing a family outing to the desert. We wanted to see the first harvest, and Bujen and Langi would get to see a totally different part of the world. We scheduled it for a few weeks before school started in the fall so the harvest would be in full swing. We prepared the kids for the trip with satellite images, videos, and discussing the sights and sounds they'd experience. We planned to stay in an RV and travel from site to site. After landing on a hot sunny afternoon in Vegas, we picked up the RV, stocked it with enough food and fuel to last the week, and began our journey.

As we entered the desert, I saw Joe's eyes light up, reminding me how much he loved it here. He pointed out sights along the way till we got to an unharvested Jatropha grove. We selected a representative site, then dug deep into the nearby soil to compare its color and consistency to adjacent desert ground. We exposed several roots to see their size compared to their above-ground growth, and then the kids helped us pick and crack a bushel of nuts to record their oil and cake density. Next we drove to where irrigation machinery was running. While Bujen and Langi looked for lizards, Joe and I shot video as the equipment went from row to row. When the operators stopped for a break, we talked with them about what issues they were having. Then we joined Bujen and Langi looking for wildlife. Together we spotted several types of lizards, jackrabbits, and butterflies by the dozens. With his binoculars, Joe spotted a herd of pronghorn in the distance. Since Joe was now as knowledgeable as a park ranger, he pointed out cacti, native brush, and wildflowers, giving their common names and pertinent facts on each. Then we moved to a site being harvested and watched as the machine went from row to row, just as we had seen in Mexico a few short months ago.

Joe had selected a dozen different sites to visit, each one with a different hybrid. He wanted to get a first-hand visual comparison before the statistical results came back from the harvest. At each site, the kids helped document our findings: the size and consistency of the trees, roots, and nuts. This was followed by taking photographs of the adjacent areas to document how far till they returned to native desert soil.

At night we sat out under the stars with the kids; all of us were dazzled by their brightness and number. We found constellations we watched at home, but with far more visible stars here. We also found a couple constellations which couldn’t be seen from home. All the while we were listening to the night sounds, sometimes soothing but sometimes scary, when an occasional big cat or coyote could be heard killing and feasting on its newfound prey. Those always brought the kids to our laps, hiding their faces in our chests.

After we put them down for bed, Joe and I would sit outside to continue the experience with a glass of wine. We talked about the kids, our future, but most of all, their futures. Joe was so serene out here; it felt like talking directly to his soul. It became our time with nothing else to interfere. After a while, we’d start preparing blankets and help each other undress. Then we’d lie down naked and keep talking as we caressed each other. Soon we were together; sometimes Joe on top, other times me. Night after night, we didn’t miss a single one. Afterward, we’d both fall asleep, and whoever woke first, would wake the other and carry our stuff into the RV. Then we would fall back asleep to our children's sleeping noises.

When we returned home, the new school year was upon us. Over the preceding days, Bujen had been a mix of fear and excitement at the thought of her first day. Even with Langi's help, we couldn't calm her down. One minute she'd be smiling as she talked about the things she'd be doing; the next in tears at the thought of leaving home. She awoke early Monday morning and came in our room, motherly instinct awakening me. Quietly we left Joe sleeping, making our way to the kitchen for a drink, then to the sofa for a quiet talk about her upcoming day at school. Before long Langi joined us, and after our conversation got a little loud, Joe came in with a kiss for everyone before heading off to work. I made their favorite, scrambled eggs with salmon, then helped them decide on what to wear. We walked to the bus stop and I kissed them as they boarded and waved as it drove away. I brushed away a tear and thought about the rest of my day. I'd made plans of things to do to keep my mind off them being gone, the first, to walk with Joan and Paris, other stay-at-home moms who lived nearby.

The kids' first week at school went well. Bujen's anxiety died down by the day. On the walk home, she'd tell me about her day's activities, especially anything Miss Kitchen had done or said to her. Langi had already made a best friend, Arjen. They ate lunch and sat next to one another in class. I made a mental note to get his parents' contact information and invite them over some Saturday.

Soon Joe was telling me the results from the harvest: wood growth, soil, nut, and oil measurements to see which hybrids fared best. These measurements would be repeated next year for the final decision on the hybrid to use for the remainder of the plantings. As expected, there was quite a bit of variation in the results. Some hybrids were better at oil production, some for total wood growth, and some fared better with less irrigation that would enable reduced water and energy usage. The team had to devise an algorithm that would determine hybrid percentages for the full planting.

"It was done based on our two main priorities. First, plant enough of the high-oil-producing hybrids to make sure biofuel requirements are met, so in combination with our synthetic fuel, petroleum usage eventually ends.

The remainder will be the hybrids that maximize carbon capture. Overachieving our target means additional money to pay for expenses," Joe explained one night.

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We'd begun meeting with the other Marshallese adoptees as they got settled in town. They were spread all over the region, so we began arranging regular weekend visits at various parks for a pitch in lunch.

"How about we have a Christmas jebta so we can have our big celebration with everyone?" Langi asked at one picnic.

"We can have small groups from the same area practice, then arrange a central place for our Christmas celebration where everyone can meet." one of the parents suggested.

"That's a great idea, I've got everyone's contact information so I'll send it out when I get home tonight and start looking for a venue."

Chapter 28

April 2044

I looked at the figures on the screen one more time, but of course they didn't change. Our international group was presenting the latest global emissions data along with future projections to Jennifer's staff. These were pulled together from member countries due to present next month at the annual global conference. I recalled Antonio telling me last year's results were below targets, but these were even worse— only a slight drop in year over year global emissions, and the projected net zero year pushed back to 2062, a full decade beyond the requirement for feedback stability.

"Damn it, why aren't they better?" Susan barked at Rex Preston, the group's manager.

"These numbers just can't be right," followed Goa, equally irate.

"Too many countries are still lagging behind in their commitments," Derek explained. "Only incremental improvements, not significant reductions like we expected.

"Do we know why?" Jennifer asked calmly, trying to tone down the palpable anger in the room.

"There were many reasons given: funding shortfalls, project approval delays, staffing issues, etc. The list was quite long. Several did say they'd have better numbers next year."

"Those aren't reasons; they're excuses. And they said the same thing last year. How can they expect any credibility now?" I yelled, trying unsuccessfully to control my rising anger.

"These are wholly unacceptable," Jennifer agreed, straining to keep her anger down. "When the climate change council meets next month, I'm going to have to insist they immediately enforce penalties to send a strong message to get more countries on track. They all signed onto these levels and agreed to the fines."

Charlie's staff met the following week, and I was asked to give a more detailed status of our emissions. When I arrived, the president, vice president and chief of staff were already there, a first for this meeting.

"Good afternoon Mr. President and Mrs. Vice President," I said, shaking their hands as I entered. The meeting began, and I listened as

Charlie presented the data I'd seen at Jennifer's meeting. Then he asked me to review our emissions.

"The results are very good, we're not only ahead of our commitment, but we're also ahead of the increased levels approved by Congress," I began. "All of our projects are ahead of their targets, both emissions and carbon capture. Our net emissions last year were down to one GT, and we're on pace to be net zero by 2047. Once our carbon capture projects are all in place by 2052, we project one GT negative emissions."

Next I showed a breakdown of each project, its current status, and projections at maturity. Lastly, I broke down their costs, both startup and on-going with positive entrees for offsetting products and credits for overachieving our target.

"That's truly wonderful news, Joe," the president responded after I sat down. "I had full confidence in your team, and you've come through with flying colors. But even with our overachievement, globally there'll still be six GT emissions in 2052 if more countries don't step up their efforts, and feedback will outpace carbon capture— net zero won't be achievable.

"I've said all along that failure isn't an option, and dammit, I meant every word. So we're going to help figure out how to remove those last six GT. Your team exceeded U.S. targets on both emissions and carbon capture, so I know it can be done. I want your team to hand off their domestic projects to Susan's team, then go to work figuring out how. I imagine there are several ways to get there, having more countries overachieve, bringing up the underachievers, or some combination of the two. Come up with the options and rank them by likelihood of success. I want to see the options in three months."

"Economics plays a huge part in carbon capture projects; how should we handle that aspect?" I asked, knowing that to be one of the main stumbling blocks.

"We know how much six GT is worth in fines, use that for starters and see how much of a dent you can make. For the remainder, do more of what you did with our programs, offset some of their costs with saleable products. Our projects are nowhere near as expensive as we first thought."

"Pardon me for asking, Mr. President, but why three months?"

“The international meetings are scheduled then, and I have it on good authority that a large contingent of countries will be voting to fully assess the agreement’s fines and trade embargoes unless globally we project to be back on track by the end of the year. Violating countries should be more than happy to spend only the fine money to get there. Your team’s options will be the starting point for these negotiations.

“Vice President Boswell attended a global security conference last week in my absence, and I wanted her to brief you on those discussions and how it underscores the importance of your assignment. These are highly confidential and can’t leave this office.”

“As you’re all aware, sociologists have begun calling this period ‘The Last Migration,’ she began. “Every country is seeing it at differing levels, based on their own circumstances. It started decades ago in the poorer coastal countries with fragile infrastructures: people moving inland as the seas rose, erosion accelerated, and storms became more severe and frequent. Then it spread to island nations who emigrated where they could. Next were the inland countries as drought brought food and water shortages. Bloody civil wars or wars with bordering countries began breaking out in many of these as their leaders couldn’t keep promises of food, water, and safe shelter. The main speaker at the conference showed a series of studies that correlated climate-related hardships with the outbreak of these wars.

“Wealthier countries have now begun experiencing high migration rates. Here, it began after the back-to-back historic hurricanes on the Atlantic coast. Homeowners and business owners, grown tired of evacuating every few years, followed by rebuilding only to watch their property be destroyed yet again. New development halted as banks and other lending institutions no longer accept the risk. Property taxes and utility bills have rose drastically to pay for frequent infrastructure rebuilding. Homeowners and flood insurance rates have similarly skyrocketed. Recent demographic studies showed significant migration increases on all coasts, along with densely forested areas at high wildfire risk in the drier western states.

“The second part of the conference was to use the climate-hardship-to-war-outbreak relationship and project it to other countries. All the studies conclude the same thing, every country is at high risk of war when climate hardship becomes great enough. While most countries haven't reached the high risk level yet, one thing is perfectly clear: all will if feedback isn't halted; it's just a matter of time."

"So that's the importance of this work and why failure isn't an option," the president said, concluding the meeting.

Walking back to my office, I needed to put the vice president's warnings out of my head and concentrate on developing a process to arrive at reasonable options. I couldn't think about famine, wars, or Bujen and Langi's futures and expect to figure out solution options. I took the stairs and stopped between floors to blot out all disturbances and just let my mind think about that. I began by going through scenarios for various countries, but after just a few, I realized there wouldn't be time for a country-by-country focus. There was too much analysis, bureaucracy and competing voices. So I changed strategies and replaced countries with resources. *If we could just figure out a strategy to use them.*

Every acre of land and mile of sea had renewable energy resources, like the sun, wind, and hydro. Plus there were plenty of resources that could be used to produce motors, turbines, solar panels, batteries, bio and synthetic fuels, and organic fertilizers. Most industrial products now had petroleum-free processes and alternatives; even a carbon-free cement process that had recently been developed. The technology was now in place, and the economics were favorable for large global emission reductions, regardless of where they originated. Luckily, the atmosphere didn't care about borders.

Next, I focused my thoughts on carbon capture— harder, yes, but as we'd shown, just as technically feasible. Sure, it was an economic challenge, but we'd done a damn good job at that, and there would be large funds available from the fines. Coming back to resources, I thought about our projects: trees and increased vegetation by increasing soil fertility wherever possible, ocean plants like kelp and mangroves, phytoplankton to increase marine life and carbon capturing rock powder. But could we get six GT in so short of time?

That night I talked with Bev about the study's conclusion, "You've known the danger of large-scale wars all along; you've told me about it many times."

"It was the only logical conclusion. But seeing the studies show the high correlation, took my fear to another level. Just imagine China, Russia, Europe, Japan, India, or the U.S. if we reach that point. And we're less than a decade away from it being inevitable."

"Can net zero be reached?"

"I spent the afternoon trying to find a way to determine just that."

"I want to help. The desert project is on track. Benjamin did a fine job while I was on leave; and he can pick it up again and finish it. Put me on your team to help you figure it out."

"You never cease to amaze me. I'd love to have your help."

With Bev's help, we spent a nearly sleepless weekend pulling my ideas into a coherent format.

"We've got a new challenge," I began my staff meeting the following week. "We're going to hand off our domestic projects and begin working on global ones."

After I reviewed our task and the consequences of failure, I laid out our strategy. "Resources are just another word for commodities. Take renewable energy. Since there are so many storage options available, anyone can make power, store it, and then sell it where it's needed. By 2052, globally there still projects to be three GT of fossil fuel power emissions, half of our problem. It's mostly in places without the capital or grid to switch to renewables. Since renewable energy is cheaper to produce, we just need to put together a low-cost storage and delivery system. Mason, your team will focus on this. I need you to get two GT of emissions with no cost increase over the current.

"But the highest emissions will still come from transportation: air, rail, ship, and roadways all play a part. There are several options to eliminate or bring down emissions for each type. Bernice, your team knows these like no one else and will focus on these. It's such a complicated field, so spend time to fully understand all the options, both pros and cons. This may be the place where a country-by-country assessment is needed. See how each country is handling each transportation type and what strategies would work best in the highest emissions countries. Look at options that work best for their circumstances. I want you to target half of the fine money to achieve two GT reduction as well.

“All other teams will focus on carbon capture with the remainder of the funds to achieve the remaining two GT. Derek’s team on forestation, Gabriel’s on kelp and mangrove forests, Suzette’s on phytoplankton, Cal’s on biochar and soil fertility, Stacey’s on mineral sequestration, and Bev’s on desert afforestation. Use your team’s expertise to discover the most efficient ways for capture. What I’m envisioning is a cost versus capture amount graph for each method. Make sure to include cost offsetting products, like biofuel and kelp, with the prices and costs of the country where the work would be done. We have three months to finalize our strategy details, so take this week to hand off to Susan’s team, and then we get to work. I hope all of you are as excited about this as I am; you have the opportunity to do truly great things.”

That night after tucking in the kids, we stood outside their room quietly talking. “You know the first thing I did after our meeting?” Bev asked. “Looked up data on the Sahara. Do you know how big that sucker is? I calculated that if we planted Jatropha at our desert percentage, we’d have our six GT with plenty to spare. And just imagine all that biofuel to bring down transportation emissions to boot.”

“Oh, the Sahara is already spoken for. Mason stopped by my office before I left and said it was the most efficient solar power site in the world. They could make energy so cheap, he could afford the storage and shipping costs anywhere in Europe, the Middle East, or Africa.

“I imagine the president would start WWIII by pushing either of those proposals,” Bev said dejectedly.

“Yeah, like our projects, they should be spread out all over and use all the alternatives at our disposal. But at least they show the possibility of success, a glimmer of hope instead of world destruction. Both of them deserve that,” I said staring at our sleeping inspirations.